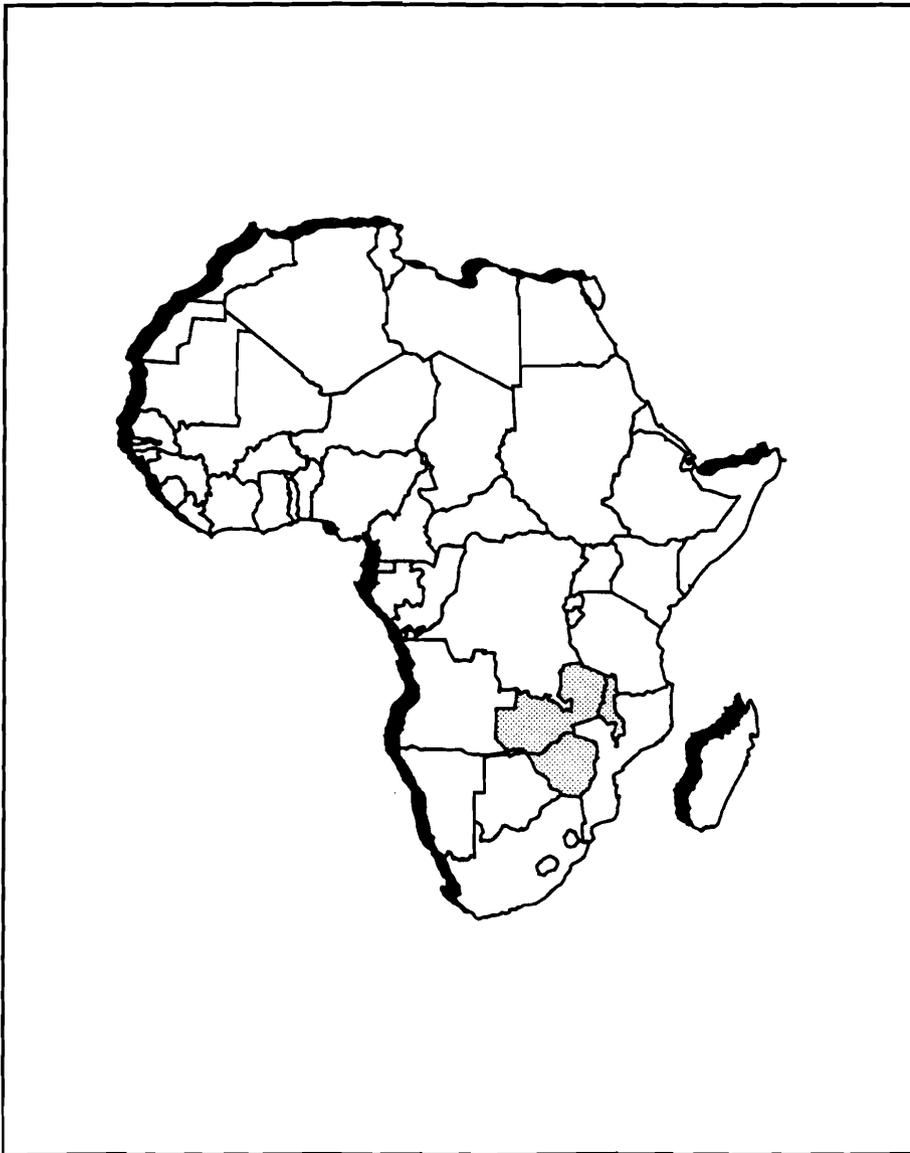


PN-ABT-614

Vulnerability Assessment



Contains reports on:

Malawi

Zambia

Zimbabwe

Vulnerability Assessment

December 1994

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FEWS Southern Africa Vulnerability Assessment

Errata

Please note the following changes to the content of the FEWS Southern Africa *Vulnerability Assessment* — published in December, 1994

MALAWI

1. On page 3 the following;

Throughout much of the region, vulnerability levels increased during the 1993/94 agricultural season. There are an estimated 8,855,000 people in Malawi, Zambia, and Zimbabwe considered to be moderately or highly vulnerable to famine (see Page 38 for the FEWS Vulnerability Index).

Malawi—the largest vulnerable socioeconomic group is smallholder farmers that have access to less than one hectare of land. Over 50 percent of the country's population (about 5,165,000 people) are estimated to be either moderately or highly vulnerable to famine. An additional 650,000 estate tenants or urban dwellers are also considered to be either moderately or highly vulnerable to famine.

should read:

Throughout much of the region, vulnerability levels increased during the 1993/94 agricultural season. There are an estimated 8,200,000 people in Malawi, Zambia, and Zimbabwe considered to be moderately or highly vulnerable to famine (see Page 38 for the FEWS Vulnerability Index).

Malawi—the largest vulnerable socioeconomic group is smallholder farmers that have access to less than one hectare of land. Over 50 percent of the country's smallholder population (about 4,500,000 people) are estimated to be either moderately or highly vulnerable to famine. An additional 650,000 estate tenants and urban dwellers are also considered to be either moderately or highly vulnerable to famine.

ZAMBIA

1. Table 2 on page 11 should reflect the following:

Table 2. Zambia: Highly and moderately vulnerable populations 1994/95

	Moderately	Highly	Total
Zone 1 SSFs	100,000	200,000	300,000
Zone IIa SSFs	500,000	250,000	750,000
Zone IIb SSFs	100,000	150,000	250,000
Zone III SSFs	—	—	—
Fisherfolk	—	—	—
Urban Poor	750,000	—	750,000
Total	1,450,000	600,000	2,050,000

Source: FEWS/Zambia

2. On page 12 the following;

The small-scale farming sector can be divided into three subgroups which correspond to three main geographic areas. These will serve to organize the rest of this section of the vulnerability assessment. They are: the high rainfall zone of northern Zambia (Agro-Ecological Zone III); the medium rainfall zone (Agro-Ecological Zone II) of southern Zambia; the plateau regions of Agro-Ecological Zone II; and the valley regions of the low rainfall zone (Agro-Ecological Zone I)—(see Map 3). Farming systems and soil qualities differ, but rainy season lengths are generally the same within each of these three areas.

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FEWS Southern Africa Vulnerability Assessment
Errata (*continued*)

ZAMBIA (*continued*)

Small-scale farmers in plateau regions of medium rainfall Areas (Agro-Ecological Zone II)

Vulnerability level—Small-scale farmers in the plateau regions of the low and medium rainfall zones of Zambia are more vulnerable to food insecurity in 1994/95 than are their counterparts in the high rainfall zones with approximately 1,000,000 people (about 40 percent of the area's population) being moderately vulnerable. The remainder of the region's population is slightly vulnerable to food insecurity.

should read ...

Small-scale farmers in plateau regions of medium rainfall Areas (Agro-Ecological Zone II)

Vulnerability level—Small-scale farmers in the plateau regions of the low and medium rainfall zones of Zambia are more vulnerable to food insecurity in 1994/95 than are their counterparts in the high rainfall zones with approximately 1,000,000 people (about 40 percent of the area's population) being moderately to highly vulnerable. The remainder of the region's population is slightly vulnerable to food insecurity.

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Executive Summary

MALAWI

Dependent smallholder farmers make up the largest share of moderately to highly vulnerable people in Malawi. About 4.8 million people (about 47 percent of the Malawian population) are affected by serious food insecurity. Current weather conditions and the seasonal forecast, at least a moderate El Niño Southern Oscillation (ENSO) event, could disrupt rainfall enough to seriously affect the already below-average harvest prospects—further sustaining, and possibly increasing, already high levels of vulnerability and straining the currently adequate Strategic Grain Reserve.

ZAMBIA

Vulnerability levels in Zambia are higher as the 1994/95 agricultural season begins than they were a year ago. Approximately 1–1.25 million rural Zambians are moderately to highly vulnerable to food insecurity this year, due primarily to poor production during the 1993/94 season. Last year's poor harvest was due to erratic, below average rainfall in the southern half of the country which ended in February (two months earlier than normal), the untimely and disorganized distribution of agricultural inputs, and marketing problems which led to reduced incomes for small-scale farmers. The below average rains also exacerbated water supply problems which had not significantly improved since the 1992 drought. Rural Zambians' access to water for human and livestock consumption is now the at the lowest level in decades.

About 75,000 metric tons (MT) of relief food has been pledged by the Government of the Republic of Zambia (GRZ), donor nations, and NGOs and are currently being distributed by the Programme Against Malnutrition (PAM—a Zambian NGO) in drought-affected areas of the country. In addition, an emergency water supply project funded by the GRZ and donors is being implemented to cope with rural water shortfalls. Despite these efforts, many of the same problems farmers faced in 1993/94 are likely to hinder production again in 1994/95. Consequently, rural levels of vulnerability may remain as high in 1995/96 as they are this year.

ZIMBABWE

Current vulnerability is found to be rising amongst many of the communal area populations which have the highest baseline vulnerability, most of them are located in the southwest of the country. Slightly more than 1 million people in Zimbabwe are judged to be highly vulnerable. Food relief is currently being provided. Food stocks in the country will forestall any major food crisis through 1995.

FEWS REGION

Vulnerability Increases in Southern Africa Following Another Below-average Harvest

Throughout much of the region, vulnerability levels increased during the 1993/94 agricultural season. There are an estimated 8,855,000 people in Malawi, Zambia, and Zimbabwe considered to be moderately or highly vulnerable to famine (see Page 38 for the FEWS Vulnerability Index).

Malawi—the largest vulnerable socioeconomic group is smallholder farmers that have access to less than one hectare of land. In this group, over 50 percent of the country's population (about 5,165,000 people) are estimated to be either moderately or highly vulnerable to famine. An additional 650,000 estate tenants or urban dwellers are also considered to be either moderately or highly vulnerable to famine.

Zambia—about 2.65 million people (about 23 percent of the population) are considered moderately or highly vulnerable to famine, including small-scale farmers in the plateau regions of normally medium rainfall areas, and in valley regions of normally low and medium rainfall areas.

Zimbabwe—nearly 1 million people are considered to be highly vulnerable to famine, primarily in southern Zimbabwe.

The primary reason for the increase in vulnerability to famine during 1993/94 is the below-average agricultural harvest, the second in the past three years. Although the 1992/93 agricultural season provided a bumper crop across much of southern Africa, the production from the 1991/92 and 1993/94 seasons were well below-average. In Zambia and Malawi, these harvests were two of the worst in the last 20 years. In Zimbabwe, although the 1993/94 agricultural season was slightly above average, the 1991/92 season was well below average. In Zambia and Malawi, a breakdown of the credit delivery systems has also contributed to a decrease in national agricultural production.

Of these three countries, Malawi is most affected by food insecurity, in terms of both food availability and food access. As a result of delayed and poorly distributed rainfall, and the break down of the agricultural credit delivery system, 1993/94 maize production is estimated at only 891,000 MT, compared to average production that ranges from about 1,201,800 to

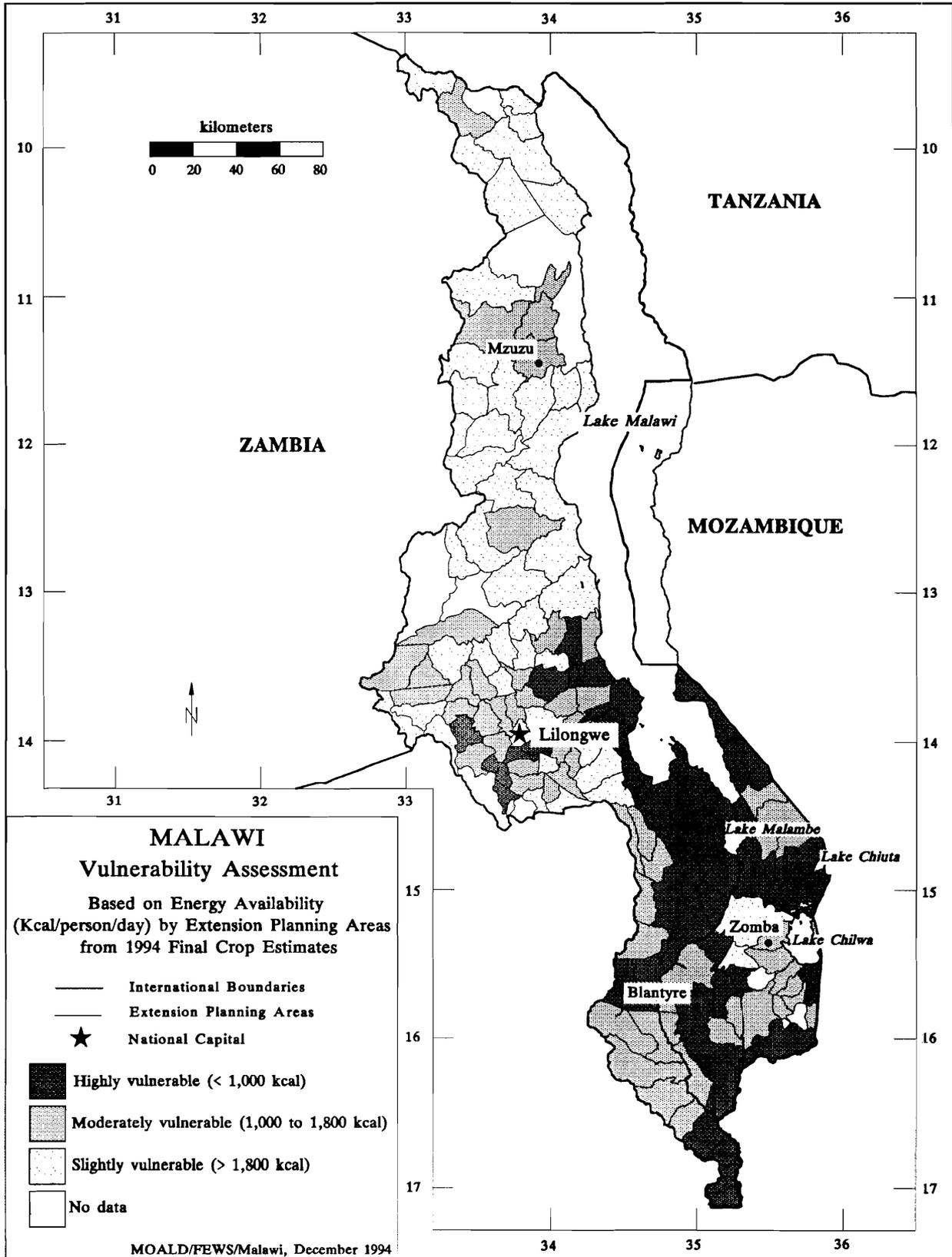
1,589,400 MT (between 1982/83 and 1990/91). This poor production level, combined with a weak marketing system, has resulted in a cereal deficit of almost 500,000 MT. Even with donor pledges of emergency food assistance (126,000 MT out of a requested 175,000 MT) and loans to purchase food (188,000 MT out of a requested 270,000 MT), there is still a significant unmet cereal deficit. The food access situation is equally worrisome. The recent variability in agricultural production is especially destabilizing for rural smallholders given their precarious economic situation. The World Bank has recently estimated that approximately 60 percent of rural inhabitants in Malawi, are below the national poverty line. The purchasing power of smallholder farmers, especially those with access to less than one hectare of land, has been seriously eroded.

El Niño Event Update

The current, precarious food security situation in southern Africa could potentially become much worse given current predictions of a moderate El Niño event, and its consequent prospect for another poor agricultural harvest. To date, both the Climate Analysis Center (NOAA/CAC) and the Drought Monitoring Centre (based in Harare) have said that a mature El Niño event will occur this year. A mature El Niño event is closely associated with drier than average, and an irregular distribution of, rainfall. Although there is no way to precisely determine the exact countries that will be affected by any particular El Niño event (the area affected could expand or contract depending on the intensity of the event), the likely countries that will experience erratic rainfall and long dry spells are parts of Zimbabwe, Mozambique, Botswana, Malawi, Lesotho, Madagascar, and South Africa. Some parts of Kenya, Tanzania, and Uganda could receive above normal rainfall.

Another below-average agricultural harvest will seriously threaten food security in the region, particularly in Malawi and Mozambique. Zimbabwe and South Africa however, will benefit from apparently sizeable food stocks that will allow them to withstand a poor agricultural harvest.

Map 1. Malawi: Vulnerability Assessment—Based on Energy Availability (Kcal/person/day) by Extension Planning Areas from 1994 Final Crop Estimates



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MALAWI

MALAWI

Poor 1994/95 Agricultural Production Increases Vulnerability

Based on a report released by FEWS/Malawi on December 15, 1994

SUMMARY

The Government of Malawi (GM) has estimated that 4.8 million people (nearly 47 percent of the total population) will require emergency food aid of at least 175,000 MT through March 1995. This increase in the number of people requiring emergency food assistance compared to last year is due primarily to the poor 1994/95 cereal harvest that resulted from delayed and poorly distributed rainfall. This year's drought was the second in three years, and it came before most farmers had recovered from the drought of 1991/92, reinforcing their vulnerability. The GM has adopted a strict geographical targeting plan to reach those EPAs that had well below average 1993/94 agricultural production.

Classification of Malawian socioeconomic groups include: smallholders, estate tenants, urban poor, and farmer/fisherfolk. The groups most vulnerable to famine have been identified as smallholder farmers that cultivate less than one hectare of land (especially female-headed households), estate tenants, and the urban poor.

COUNTRY BACKGROUND

Malawi's population is now estimated at about 10,280,000 people. The economy is heavily dependent on the agricultural sector, with nearly 90 percent of the rural population deriving their livelihood from agriculture (UNDP, 1993). Furthermore, agriculture contributes about 33 percent of the country's Gross Domestic Product, almost 90 percent of the country's export earnings (primarily from tobacco, tea, and sugar), and about 75 percent of the country's employment.

Agriculture in Malawi is characterized by a dual structure of smallholder and estate sub-sectors. The difference between these sub-sectors is primarily in land tenure, crop, production, and marketing arrangements. The estate sub-sector has substantially higher productivity compared to the small-scale sub-sector, primarily because of types of crops cultivated, and access to inputs, technology, credit, and institutional services (UNDP, 1993). The estate sub-sector is based on leasehold tenure, and comprised about 14,000 estates with a total of 850,000 hectares in 1989 (Mkandawire et al, 1990). Estate farming relies heavily on tenant farmers, hired permanent and seasonal workers, and the production of higher value crops.

The smallholder sub-sector is based on customary land tenure, is subsistence oriented, and provides almost 80 percent of the country's food production. This sub-sector engages about

1.6 million households cultivating about 1.8 million hectares. There are two groups of smallholder farmers: subsistence (those that cultivate more than one hectare) and dependent (those that cultivate less than one hectare) smallholders. The distinction is based on land availability and holdings since the shortage of land represents the major constraint to increased smallholder productivity. Roughly 13 percent of these farmers cultivate two or more hectares; 31 percent farm between one and two hectares; and another 56 percent of smallholder households cultivate less than one hectare. The cultivation of local maize varieties dominates smallholder agriculture, accounting for about three-fourths of cropped area. Other important crops include groundnuts, tobacco, cassava, cotton, rice, pulses, and potatoes. Production technologies are almost exclusively hand-held tools, with very little chemical or organic inputs. This sub-sector's low productivity can be attributed to a combined impact of small land holdings, unimproved crop varieties, and large storage and processing losses.

In Malawi, poverty is widespread. The World Bank (1990) estimates more than half of the population live below the poverty line. The UNDP estimates rural poverty at 60 percent, and urban poverty at 65 percent. Although Malawi's chronic malnutrition rates have slightly improved since 1980, they remain among the worst in Africa. The 1992 Malawi Demographic and Health Survey estimated that the national rate of stunting (height for age) for children under five years old was 49 percent, compared to 56 percent in 1980/81. Since these 1992 nutritional data were collected, however, Malawi has experienced many significant events that have had a mixed impact on food security, including:

- Variable agricultural production (two well below average and one well above average agricultural production seasons)
- Economic structural adjustment
- Strong devaluation of the Malawian Kwacha
- Failure of the rural credit system
- Repatriation of thousands of Mozambican refugees, and
- A multi-party Presidential election

Although maize production was relatively stable between the 1982/83 and 1990/91 agricultural seasons (ranging from 1,201,757 to 1,589,377 MT), maize production in the past three agricultural seasons has not been near this range. The 1993/94 agricultural season, however, was well below average (891,000 MT) across Malawi, which followed a bumper crop in 1992/93 (2,143,502 MT) and an extremely below average harvest in 1991/92 (657,469 MT).

Contributing to low productivity this past agricultural season, in conjunction with the late start and poor distribution of

rains, was the breakdown of the agricultural credit system. During the campaigning activities preceding Malawi's first multi-party presidential elections, many smallholders were led to believe that loans taken the previous year would be forgiven. Smallholder clubs that do not repay 100 percent of their loans granted in each year are not reissued credit the following season. Entering the 1993/94 season, only 15 percent of the 1992/93 loans issued nationally had been recovered. Therefore, only 4,137 clubs were eligible for seed and fertilizer credit this season, compared to 15,730 clubs in 92/93. Typically, the recovery rate of agricultural loans to smallholder clubs has been above 80 percent. The impact of the credit system failure this year (at a 27 percent recovery rate for the 1993/94 credit), severely limits access to the available stocks of hybrid seed (primarily maize) and fertilizer. Smallholder farmers are expected to be unable to afford even modest amounts of fertilizer, primarily because of high and increasing prices (due to the devaluation of the Malawian Kwacha), high external transport costs, and the loss of fertilizer subsidies.

More than 80 percent of Malawians live in rural areas and are subsistence farmers, cultivating 75 percent of the country's arable land. These farmers rely exclusively on rainfed agriculture. Historically, the Southern Region is a food production deficit area, while the Central Region has been a surplus area. Almost 90 percent of the nation's population live in the Southern and Central regions, where high malnutrition rates have been chronic.

Following the below-average 1993/94 agricultural harvest, the GM estimated in July that 4.8 million people (47 percent of the population) needed emergency food, which totaled roughly 175,000 MT. The most severely affected from the poor agricultural harvest started receiving relief food assistance, consisting of 9 kg/person/month maize rations. Still, seventy percent less relief food was requested this year compared to the 1991/92 drought for the following reasons:

- The magnitude of the cereal deficit (primarily maize) was less this past year than during the drought (e.g., 234,000 MT more of maize was produced in 1993/94 compared with 1991/92).
- Donors' assessed that the relief food provided after the 1991/92 drought was too plentiful.
- Dimba (a garden cultivated either in a flood plain depression (*dambo*) or as the river recedes) and estate production levels are not formally part of the historical annual crop estimates. Ongoing studies indicate that the agricultural production from these two sources significantly contribute to the country's food supply.
- Households have adopted a diverse set of coping mechanisms (see individual sections) in response to repeated droughts.

It is important to note that little data and information are available about the contribution to household income from other income sources. Recent studies using key informants indicate that *ganyu* (casual labor), businesses, and livestock or fishing rank among the top three cited most important sources for each of twenty-four districts in the country.

ANALYSIS OF SOCIOECONOMIC GROUPS

The principle segments of the population considered to be more than slightly vulnerable to famine are dependent smallholder farmers (those with less than one hectare of land), estate tenants, and the urban poor (see Table 1), farmer/fisherfolk are considered to be slightly vulnerable. The smallholders comprise over 80 percent of the country's population, with dependent smallholders comprising approximately 25 percent of smallholders, or 20 percent of the country's population.

Table 1. Malawi: Socioeconomic group and 1994 vulnerability

Group	Approximate total population	Number more than slightly vulnerable
Dependent smallholders		
male-headed	1,162,000	1,115,000
female-headed	3,486,000	3,400,000
Estate tenants	480,000	400,000
Urban dwellers	1,300,000	250,000
Farmer/fisherfolk	200,000	—

Source: FEWS/Malawi

Dependent Smallholders

Dependent smallholder farmers represent the largest group that is vulnerable to famine, with approximately 4.5 million persons considered more than slightly vulnerable. An analysis of chronic vulnerability to famine, based on an energy availability analysis that calculated the available kilocalories per person per day, reveals that on aggregate, households in 54 EPAs (up to 3.9 million people) are moderately to highly vulnerable. The measure used include:

- Highly vulnerable—having less than 1,000 Kcals/person/day
- Moderately vulnerable—between 1,000 and 1,800 Kcals/person/day; and
- Slightly vulnerable—more than 1,800 Kcals/person/day.

Following the 1993/94 drought, households in 103 EPAs were estimated to be slightly vulnerable. Almost 2.7 million individuals who are typically slightly vulnerable, are now moderate to highly vulnerable.

More than half of the dependent smallholders are net purchasers of maize, and therefore depend on the market for food purchases. This group is also estimated to spend a disproportionate share of their income on food compared to self-sufficient smallholders. Because their principle income source is their own farm production (73 percent), they are more exposed in the event of a crop failure.

Regional vulnerability

There appears to be no concentration of households that are highly vulnerable in the Northern Region. Five Northern EPAs, however, have been estimated as moderately vulnerable (Lufita, Emfeni, Mpherembe, Zombwe, Bwengu). The Central Region, typically the agricultural surplus producing portion of Malawi, contains a striking number of EPAs which have moved from slightly to moderately vulnerable. There has been no change in the amount of Kcal equivalents of maize produced in 16 of the Southern Region EPAs, though there have been some increases in 12 EPAs in this normally deficit production region. The remainder of Southern Region EPAs have shown a general decline in "equivalent's" production.

There are about 600,000 female-headed households nationwide, which is 30 percent of the rural smallholder households representing 42 percent of the farming population. These households tend to have the smallest land holdings, and are more affected with cash, food, and labor shortages. These households are normally the smallest landholders with less access to credit and lower wages for *ganyu* than their male counterparts. They are headed by women who are unmarried, widowed, divorced, or separated, or whose husbands have migrated for employment. With the exception of those who receive remittances from husbands, the majority of the households have no other income source. As such, the women and children in this group are at constant risk.

The three major constraints that limit the income earning potential of dependent smallholders include:

- **Land shortage**—The proportion of dependent smallholders that cultivate less than one hectare of land is about 56 percent, while 23 percent of these smallholders cultivate less than 0.5 hectare.
- **Access to inputs**—One contributing factor to declining agricultural production is the poor access to credit (to acquire fertilizer and improved seed varieties). The result is that dependent smallholder farmers rely on local, lower yielding maize varieties, accounting for about 75 percent of total cropped area. Also, usage of very little or no chemical or organic inputs have resulted in low productivity. Only 30 percent of all smallholders access inputs (through credit and extension services), while high prices of fertilizer and seed, prices of which have gone up by 49 percent and 52 percent, respectively, make them too costly for dependent smallholders to purchase.
- **Labor constraints**—Smallholder households, particularly dependent smallholders, experience severe labor constraints at peak activity periods during the agricultural season. This is primarily because smallholders—those with insufficient land to produce enough food for their own consumption and sales to meet their family income requirements—are obligated to hire out family labor during these peak periods. The result is a decrease in productivity, through neglect of their own plots, that results in these households' continual deficit production. This constraint is particularly acute in female-headed households.

To address these constraints, dependent smallholder households have historically adopted four major coping strategies:

- **Ganyu**
- **Estate labor**
- **Dimba (streambed) cultivation, and**
- **Intensified artisanal fishing**

During the 1993/94 season the poor rains and agricultural harvest significantly limited the strategies typically used, and thereby increased the vulnerability of dependent smallholders. The limited number of nonfarm employment opportunities in rural areas (loss of day labor jobs from larger farmers also hit by the poor 93/94 harvest), and the low level of education in this group confine the poor smallholders to marginal subsistence and the least remunerative levels of off-farm labor. In the coming season, instead of working their own gardens, many dependent smallholder farmers will be out looking for casual or estate labor opportunities.

Also, as a result of the low water table, off-season *dimba* cultivation (most prominent in the Southern Region) has been reduced. The ability of those households along lakeshores to increase their income from artisanal fishing is unknown at the present time.

Estate Tenants

Almost all of the households (over 80 percent) that fall in this group remain moderately vulnerable. This represents no significant change from the previous year.

In 1989, the number of tenant farmers was estimated to be 105,000. The Tobacco Association of Malawi this year estimates over 480,000 tenants on tobacco estates alone, with the majority of these living in Lilongwe, Kasungu, and Mchinji districts. The large number of tenants in Lilongwe includes those smallholders whose land was converted to leasehold during the Land Registration Exercise (late 1970s), which was intended to increase the number of farmers qualified to grow burley tobacco. The Lilongwe "tenants" are actually a subset who are self-employed. Tenant conditions are often directly related to the size of the estate. It is estimated that there are 32,000 estates divided into four categories: 18,000 estates contain less than 20 hectares, another 10,000 estates have between 20-50 hectares, 1,860 estates have between 50 and 1,000 hectares, and the final 2,140 estates have over 1,000 hectares. The tenants working on an estate in the first two categories are more vulnerable to food insecurity than their counterparts on the larger estates.

Most tenant farmers are smallholders whose diminutive plots require that they migrate in search of alternate income sources. Tenant farmers rank among the poorest and most vulnerable households in Malawi. They work mostly on tobacco estates, but unlike estate laborers they receive cash once a year after selling their produce to the estate owner. They depend on food rations provided by the estate owners, the value of which is subtracted from the value of their produce at the time of sales. Surveys show that the average tenant household is given 384 kg of maize per annum, substantially less than the 945 kg recommended for an average household to meet its food requirements. With the poor harvest this year, many estates were affected by drops in production and as a result some landlords may not adhere to food distribution arrangements. It is not currently known how tenant households supplement their income. There are some indications that some tenants still have access

to land in their home area, and that their relatives continue to farm the land.

Further detail regarding income earned from tenant farming and alternative income sources, living conditions, and other factors that affect their welfare is currently unavailable.

Urban Poor

About 20 percent of the urban poor are considered moderately vulnerable, with the remaining 80 percent considered slightly vulnerable. Despite the lack of recent data, anecdotal evidence confirms that the urban poor are more vulnerable today than they were last year.

The four main urban centers in Malawi are Lilongwe (the capital city), Blantyre, Zomba, and Mzuzu. The urban poor constitute between 11 and 17 percent of the Malawian population. Of this total, 65 percent (or 2.5 percent of all Malawians) live in extreme poverty. A recent study has shown that Malawi's rate of urbanization has accelerated rapidly since 1964 and is now a rate of 2,500 people per week. This rate is above the mean urbanization rate for African countries.

About 5 percent of the urban households are female-headed, which is less than the 30 percent found in rural areas. The urban poor are mostly found in the informal sector, amongst the unemployed and low wage earners.

Factors that increase the vulnerability of the urban poor are high inflation rates and civil servant strikes. The inflation rate has been estimated at 35 percent since the Malawian Kwacha was floated in early 1994. The impact of the increase in the inflation rate has been the steady decline in the purchasing power of urban households. In September 1994, civil servants went on strike to demand salary increases of up to 100 percent based on the rising cost of living. They returned to work after the GM promised them a 25 percent increase and a reevaluation scheduled for five months later.

The incomes of the urban poor are inadequate to meet household expenditures, rent, water, and fuel (wood). A large share of the income, nearly 68 percent, is spent on food alone. For these urban poor the main issue is access to food rather than its availability. Price fluctuations of staple foods and significant erosion of their purchasing power has led to increases in overall vulnerability.

Farmer/fisherfolk

Populations that have a reliance on income from artisanal fishing to supplement their income from agricultural production are slightly vulnerable. This represents no significant change from the previous year.

Farmer/fisherfolk are located along the shores of lakes Malawi, Malombe, and Chiuta. Districts most affected by overfishing include Mangochi, Salima, Nkhata Bay, Nkhotakota, and Karonga. Families who are entirely dependent on catches are rare, and number not more than 25,000. A further 200,000 Malawians are estimated to be working ashore as fish traders, boat builders, net makers, and in other support industries. Often the male members of a family head for the lake shores, leaving the women to tend to the inland gardens and farms.

One of the critical factors affecting the industry is the extent of water level fluctuation resulting from climatic variations. In drought years, it has been observed that the fishing yield has been reduced. The total fish landings reached its summit in 1987 at 88.5 thousand MT, and has been declining ever since.

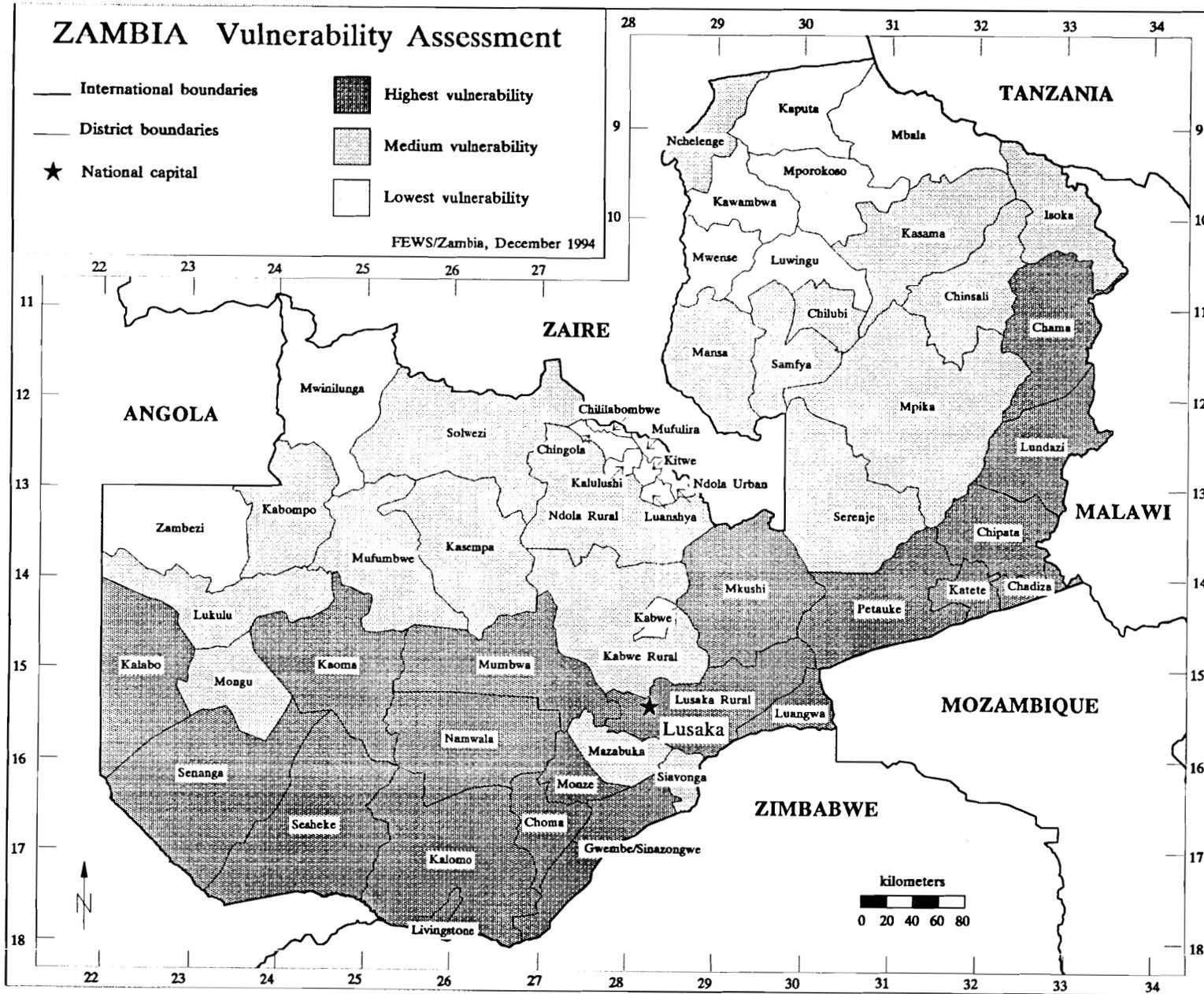
Returns to artisanal fishermen also have been declining since 1987. Diminished fish catches as a result of overfishing in the lakes has adversely affected the incomes of smallholders who live near these fisheries. Ironically, as a result of the below average agricultural harvests in 1991/92 and 1993/4, many smallholder farmer/fisherfolk have increasingly turned to fishing (or intensified fishing) as a coping strategy, thus further accelerating the decline in per capita catches.

CONCLUSIONS

Dependent smallholder farmers, especially those that are female-headed, are currently the most vulnerable population. Smallholder farmers, estimated at over 4.5 million people, have access to less than one hectare of land, use lower-yielding maize varieties and minimal fertilizer, and have inadequate labor available during peak agricultural activities (such as land preparation). Below-average agricultural production in two of the last three years has had a significant impact on reducing access to food.

Other groups who are considered at least moderately vulnerable to famine include estate tenants, and the urban poor. Estate tenants remain moderately vulnerable, the same status they held during the 1993/94 agricultural season. There are indications that the numbers of urban poor are increasing, primarily due to the large rate of urbanization, high inflation rates, and recent civil strikes. Farmer/fisherfolk remain slightly vulnerable.

Map 2. Zambia: Vulnerability Assessment



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10

Vulnerability Increases Following Second Below-average Harvest in Three Years

Based on a report released by FEWS/Zambia on December 15, 1994

SUMMARY

About one quarter of Zambia's 5,000,000 rural inhabitants are highly or moderately vulnerable to food insecurity as the 1994/95 agricultural season begins¹ (see Map 2 and Table 2).

The 1993/94 agricultural season was very poor in the southern half of the country. Low cumulative rainfall totals, an early end of the rainy season across southern Zambia, inadequate and late distribution of agricultural inputs, and ongoing marketing difficulties led to the third lowest national per capita cereals production in the last 18 years. In contrast, the 1992/93 agricultural season was excellent, as harvests were well above average in terms of per capita cereals production.

Vulnerable rural populations are primarily located in low- and medium-rainfall regions of southern Zambia. Three quarters of Zambians living in Agro-Ecological Zone I (the low-rainfall Gwenbe, Luangwa, and Luano valleys)—about 300,000 people—are estimated to have increased use of coping strategies indicative of moderate to high levels of vulnerability (see FEWS Vulnerability Index p. 38) including:

- Time-consuming wage labor
- Wild food gathering
- Sale of cattle and goats
- Reliance on family and community members for household transfers and loans

Nearly 1 million other rural Zambians in medium-rainfall plateau and valley areas (Agro-Ecological Zone II) are also estimated to be moderately to highly vulnerable. Because of the erratic distribution of rains in 1993/94, cereal yields varied greatly within small regions, creating concentrations of vulnerable people throughout the region, sometimes in close proximity to food secure populations.

Preliminary forecasts for the 1994/95 rainy season—based on analysis of global weather patterns (primarily the El Niño/Southern Oscillation Index)—indicate that it could be another poor rainy season in southern Zambia, reducing the likelihood that rural Zambians in the southern half of the country will be able to substantially reduce their vulnerability to food insecurity.

METHODOLOGY

The 1994 FEWS Vulnerability Assessment (VA) for Zambia was conducted using both quantitative and qualitative data. The quantitative component of the VA was completed in collaboration with the World Food Programme and ten other governmental and nongovernmental agencies working in

Lusaka. Nine indicators grouped into three composite indicators—Crop Risk, Market Access, and Coping Strategies/Assets—were used in assessing chronic and current levels of rural Zambians' vulnerability to food insecurity. The Methodology Annex details the procedures used for the analysis.

In addition to the quantitative analysis, FEWS/Zambia conducted extensive interviews with representatives of the National Early Warning Unit of the Ministry of Agriculture, Food and Fisheries (MAFF), FHANIS Food Security Monitoring Project, the Department of Fisheries (MAFF), the Agricultural Marketing Information Centre, PAM, CARE International, and other agencies. These interviews confirmed aspects of the quantitative analysis and provided important background and current information concerning the food security status of rural Zambians.

ANALYSIS OF SOCIOECONOMIC GROUPS

Rural inhabitants of Zambia have been grouped into four main socioeconomic groups. These are:

- Small-scale farmers² (SSFs) in the valley areas of the medium and low rainfall zones
- SSFs in the plateau areas of the medium rainfall zone
- SSFs in the high rainfall zone
- Farmer/fisherfolk

Rural areas also have populations of emergent and commercial farmers,³ artisans, and traders who were not considered in this VA because they are assumed to have the resources necessary to ensure their food security throughout the coming year.

The urban population—which includes between 40 percent and 50 percent of the total population of Zambia—was

Table 2. Zambia: Highly and moderately vulnerable populations 1994/95

	Moderately	Highly	Total
Zone I SSFs	125,000	225,000	350,000
Zone IIa SSFs	700,000	400,000	1,100,000
Zone IIb SSFs	225,000	225,000	450,000
Zone III SSFs			
Fisherfolk			
Urban Poor	750,000		750,000
Total	1,800,000	850,000	2,650,000

Source: FEWS/Zambia

not included in the quantitative analysis because the required data on sources and levels of income and consumption are not available. Nevertheless, their approximate level of vulnerability is discussed using quantitative and qualitative information from government, donor, and nongovernmental sources.

Small-scale Farmers

Small-scale farmers in Zambia cultivate less than 5 hectares of land (12.4 acres), and normally can produce only small quantities of excess crops for sale. They face numerous constraints to more intensive and/or expanded cultivation which prevent them from reducing their vulnerability to food insecurity. These include:

- The high cost of agricultural inputs
 - Poor access to credit
 - Untimely and uneven distribution of inputs to farmers with credit
 - Marketing difficulties
 - Unfavorable agro-ecological conditions
- These are discussed in greater detail below.

■ The major problem that small-scale farmers throughout Zambia face in 1994/95 agriculture season is the relatively high cost of inputs. Most SSFs have little cash this year to purchase seeds, fertilizers, human labor (for land preparation, planting, weeding, and harvesting), and animal or mechanical draft power. Poor harvests and limited access to markets during 1993/94 are the main causes of depleted cash assets.

■ High input costs were exacerbated this year by inadequate availability of agricultural credit from the three main lending institutions for small-scale farmers—Zambia Cooperative Federation/Financial Services (ZCF/FS), the Credit Union and Savings Association of Zambia (CUSA), and Lima Bank. These institutions have about K30 billion (US\$45 million) in outstanding loans from the past four agricultural seasons (approximately 50 percent of all loans made during that period), which has drastically reduced their ability to provide loans this year. The Ministry of Agriculture estimates that less than 20 percent of SSFs have used agricultural credit in recent years. The reduction in credit availability will hinder attempts by even the most entrepreneurial small-scale farmers to respond to opportunities arising from the liberalization of agricultural markets.

■ Even if SSFs had their own or borrowed financial resources to purchase inputs this year, seed and fertilizers have not been (as of mid November) as widely distributed in rural areas as in previous years. ZAMSEED, the supplier of over 80 percent of seeds during the 1993/94 agricultural season, only recently agreed to provide seeds to ZCF/FS, Lima Bank, and CUSA. These lenders have not yet fully repaid ZAMSEED for seeds received last year, and only a recent commitment by IFAD has convinced ZAMSEED to provide seeds to them. ZAMSEED continues to distribute seeds mainly through centrally located retailers—who are not widespread or easily accessible to all SSFs.

■ Marketing difficulties for SSFs have reduced small-scale farmers' incomes for the last two years, and may do so again in 1994/95. Most small-scale farmers have found it difficult to adapt to the changing agricultural markets as the sector is liberalized. Particularly affected have been those located in isolated areas far from the line of rail and the main trunk roads. In these areas, farmers have had to sell their maize at less than K5,000 (US\$7.50) for a 90 kg bag of maize—and sometimes for no more than second hand clothing worth two or three thousand kwacha—during the last two seasons. This has prevented any accumulation of profit necessary for the purchase of inputs for the next season. Even farmers more centrally located, who found buyers for their maize from the excellent 1992/93 harvest, received government promissory notes that were not paid until after the ideal planting period for the 1993/94 season, limiting their production potential.

■ Two of the last three rainy seasons have been poor in the southern half of Zambia with below-average rains that ended earlier than normal compared to the 30-year average.

■ Preliminary forecasts for the 1994/95 rainy season describe the likelihood of another below-average rainy season across the southern half of Zambia. An unseasonable early end of rains is also possible.

In addition to these constraints, female-headed households—which are found throughout Zambia, but in higher concentrations in Luapula, Western, Eastern, and Lusaka provinces—face additional obstacles to ensuring their own food security, that include:

- Labor constraints, especially for those tasks that are traditionally men's jobs (land clearing and preparation)
- Minimal creditworthiness and often severely limited access to the little credit that is available
- Fewer assets and higher dependency ratios than male-headed households

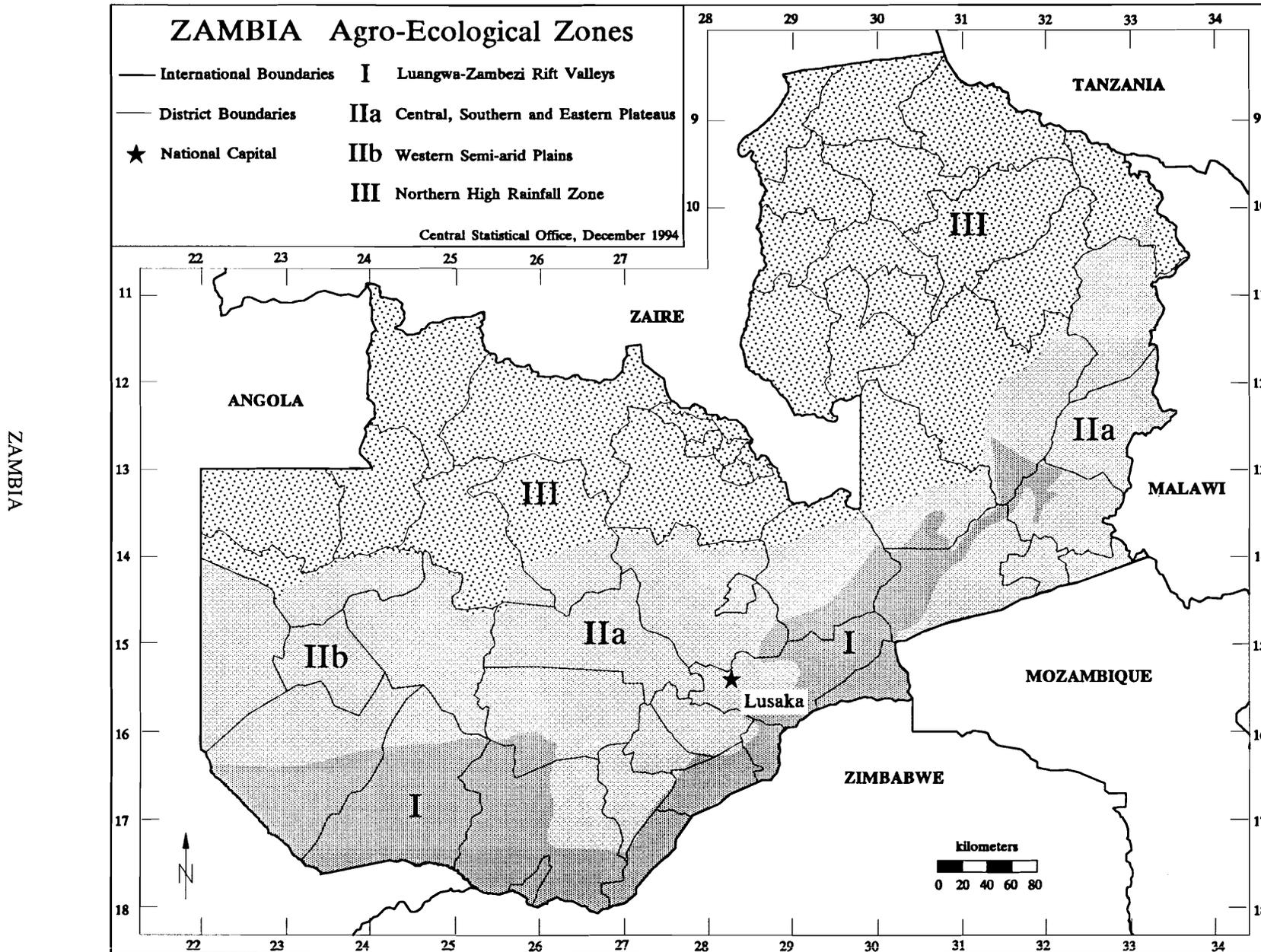
These obstacles place them at greater risk to food insecurity.

The small-scale farming sector can be divided into three subgroups which correspond to three main geographic areas. These will serve to organize the rest of this section of the vulnerability assessment. They are: the high rainfall zone of northern Zambia (Agro-Ecological Zone III); the medium rainfall zone (Agro-Ecological Zone II) of southern Zambia; the plateau regions of Agro-Ecological Zone II; and the valley regions of the low rainfall zone (Agro-Ecological Zone I)—(see Map 3). Farming systems and soil qualities differ, but rainy season lengths are generally the same within each of these three areas.

Small-scale farmers in high rainfall areas (Agro-Ecological Zone III)

Vulnerability level—Small-scale farmers in the high rainfall zone of Zambia (all of Copperbelt and Luapula provinces and most parts of Northern and Northwestern provinces) are generally only slightly vulnerable to food insecurity in 1994/95. Food stocks are usually secure for most rural people in this region throughout the year because of sufficient, well-distributed

Map 3. Zambia: Agro-Ecological Zones



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rainfall, and the widespread cultivation of cassava, a hardy, drought-resistant staple food. Nutritional indicators in this region, however, are consistently poorer than in other parts of Zambia, confirming that food security alone is not sufficient to ensure the nutritional well-being of those who live in this region.

Farming systems—Four characteristics separate this region from other regions of Zambia.

- Annual rainfall normally exceeds 1,000 mm, and in many years surpasses 1,200 mm, during a rainy season that can last six months or more
- Soils are generally acidic or swampy and the *chitemene* system—a slash and burn method of land preparation which provides needed soil nutrients—is still widely practiced in many parts of Northern and Luapula provinces
- There is little use of animal traction for land preparation anywhere in this agro-ecological zone because of the presence of tsetse flies in many areas and an unfavorable climate for cattle raising
- The area is relatively isolated from the major urban markets of the Copperbelt and Lusaka by poor roads and long distances

Farming systems are largely cassava-based in this region and are more diverse than in other regions of Zambia, with widespread maize, sorghum, millet, and rice cultivation. Cassava is mainly grown for own consumption, though in recent years there has been evidence that cassava (and other crops) are being sold or bartered for other foods and nonfood items.⁴ Cassava is a hardy crop which can be harvested year round, creating a relatively secure staple food situation for small-scale farmers in high rainfall areas. Consumption of cassava is often reduced during the months of December to April. This is because the preparation of cassava flour and chips are difficult due to increased humidity and lower temperatures. Additionally, cassava has a much lower nutritional value than maize⁵ and other staple crops.

High rainfall areas which are distant from the fisheries along the Luapula River and the lakes of Northern and Luapula provinces have relatively limited access to “relishes” (the Zambian term for all foods which accompany a staple food, such as meat, green leafy vegetables, fish, etc.). Without regular access to other foods, a cassava-based diet is inadequate to meet the nutritional needs of most people, especially growing children. This is evident in consistently higher clinical rates of underweight children (measured in Zambia as those children below the 80 percent line of weight for age) than in other parts of the country. The average clinical rate of underweight children in Northwestern, Northern, and Luapula provinces from August 1993 to September 1994 was nearly 31 percent while the remaining six provinces of Zambia averaged almost 26 percent.⁶ Though the generally good rains and year-round availability of cassava leave farming populations of this region only slightly vulnerable to food insecurity, these nutritional statistics again confirm that food security alone does not assure nutritional well-being. Factors other than the availability of sufficient quantities of food—such as child care practices and access to potable water and sanitation facilities—may help explain the higher incidence of childhood malnutrition. The

occurrence of diarrhea, dysentery, and other waterborne diseases may also be a contributing factor to high malnutrition rates in this region due to the generally wet conditions. Thus, while food assistance is rarely needed in the high rainfall zone, improvement in the nutritional status of rural Zambians in the area remains a priority. Development of cassava processing techniques, roots and tuber storage, dry season relish production, safer water supplies, and roads infrastructure would help further enhance the nutritional status of SSF families in this region.

Small-scale farmers in plateau regions of medium rainfall Areas (Agro-Ecological Zone II)

Vulnerability level—Small-scale farmers in the plateau regions of the low and medium rainfall zones of Zambia are more vulnerable to food insecurity in 1994/95 than are their counterparts in the high rainfall zones with approximately 1,000,000 people (about 40 percent of the area's population) being moderately vulnerable. The remainder of the region's population is slightly vulnerable to food insecurity.

The moderately vulnerable populations are located throughout the region, while highly vulnerable populations are primarily located in Petauke, Katete, Chadiza, and Chipata districts of Eastern Province, throughout Western Province, in Lusaka Rural District, and in most districts of Southern Province. Most of these areas currently have significant staple food deficits at the household level because of the early end of the 1993/94 rainy season. Cumulative rainfall deficits ranged from 25 percent to 50 percent, with the resulting maize crop failures affected 25–65 percent or more of planted area.

This has been the second poor agricultural production season in three years which has left small-scale farmers with low incomes and few assets on which to rely should the coming season also be bad. SSF reliance on wage and barter labor will be high in the coming months and their access to seeds, fertilizers and animal draught power difficult, both of which will have a negative impact on agricultural production in 1994/95. Access to sufficient quantities of potable water will also be difficult this year due to the adverse affect on local water tables of two poor rainy seasons of the last three. The current situation is even worse than the situation following the 1992 drought.

Farming Systems—Cropping patterns are less diversified in the plateau areas of Zambia than they are in the high rainfall zone. Commercial farmers are concentrated in this zone (primarily in Central and Southern Provinces), and maize is the predominant crop grown for consumption and sale. Farmers in these areas are more susceptible to poor rains than are farmers elsewhere who have a higher proportion of their planted fields in sorghum, millet, or cassava.

Livestock ownership (primarily cattle) is relatively common in these areas, in contrast to the high rainfall zone. Per capita Tropical Livestock Units (TLUs)⁷ ownership is particularly high in Southern Province, Kabwe Rural District and along the Zambezi flood plains in Western Province.

SSFs who own oxen or have access to oxen through relatives or neighbors are more productive farmers because they can increase their cropped hectareage and do so early in the agricultural season. SSFs without oxen, or who only have ac-

cess to oxen later in the season, cultivate less and generally prepare their land later in the season (because of the time-consuming nature of land preparation by hand and, often, their employment early in the season as wage or barter labor in the fields of large-scale farmers), making them more susceptible to poor rainfall.

On the west bank of the Zambezi River in Western Province, where crop production per capita is very low due to particularly unfavorable soil and rainfall conditions, high per capita cattle ownership serves as an important regular source of income and an asset which can be liquidated in times of need.

In this zone, several problems in relation to cattle ownership and use have also increased SSF vulnerability in recent years. Diseases such as anthrax and East Coast Fever/Corridor Disease (both subspecies of the *Theileria Parva* virus) have afflicted cattle populations in most areas of Southern and Western provinces, reducing asset holdings and the availability of animal draught power. The poor rains in two of the last three years have limited the availability of water for cattle (as well as human) consumption, further reducing the availability of animal draught power. Rising prices of vaccines and dipping chemicals, as well as reduced access to water, have resulted in decreased dipping of animals, further increasing vulnerability to diseases.

As a result of reduced production in 1993/94, many households have not been able to retain enough staple food crops to last until the 1994/95 harvest (in April and May 1995). Over 65 percent of households in eighteen of twenty districts which lie primarily on the plateau areas of the medium rainfall zone have already reported less than one month's staple food supplies (see Map 4). The proportion of households with low food stocks are almost three times as high as at this time last year (in August/September of 1993, 20 percent of households nationwide had less than a one month supply of staple food; this year the comparable figure is 56 percent). In many districts last year, no households reported less than a one month supply of food staples.⁸

Small-scale farmers in valley regions of low and medium rainfall areas

Vulnerability level—About 300,000, or three-quarters, of small-scale farmers in the valley regions of the low and medium rainfall zones are moderately to highly vulnerable to food insecurity as the 1994/95 rainy season begins. Harvests were generally poor in the Luangwa, Luano, and Gwembe valleys in 1993/94 because of patchy rainfall and an unseasonably early end to the rainy season in February, 1994, compounded by late planting due to poor access to animal draft power, seeds, and fertilizers. Valley regions at a distance from large water bodies (Lake Kariba and the Luangwa River) also are subject to inadequate water supplies this year as a result of the second year of poor rains in the last three rainy seasons. The northern end of the Luangwa Valley in Chama and Lundazi districts is an exception as rains were sufficient and harvests were, in most cases, adequate this year.

Farming Systems—Farmers in the valley regions of low and medium rainfall zones of Zambia have developed diversified cropping patterns in response to high production risks due

to low and erratic rainfall and poor soils. Maize, sorghum, millet, groundnuts, sunflower, and rice (in river recession areas) are all grown. Animal draught power is used in the Gwembe Valley (which is located along Lake Kariba in Southern Province), but not generally in the Luangwa and Luano valleys (which stretches from northeast Zambia to Lusaka Province) due to the presence of the tsetse fly. Wage and barter labor are traditionally used to supplement farming households' own food production.

Those farmers who wanted to market surplus produce from the 1993/94 season had difficulties finding buyers due to their isolation from the major trading routes.⁹ Nonfood expenses such as health care, school fees, and agricultural inputs, however, obliged many SSFs to sell, even when they could not retain enough food for their families' own consumption and when the only offers they received were for extremely low prices.¹⁰

Incomes and food stocks are consequently low this year with the majority of households in these areas currently possessing less than one month's supply of staples. All of six districts which lie entirely or predominately in the low rainfall valley—Luangwa and Lusaka Rural districts in Lusaka Province; Siavonga, Gwembe, and Sinazongwe districts in Southern Province; and Sesheke District in Western Province—reported over 85 percent of households with less than one month's supply of staple foods in September or October 1994 (see Map 4), more than five months before the 1995 harvest is expected. Last year at this time most of these districts had very low percentages of households with low staple food stocks and all districts reported less than 10 percent of households with less than one month's food stocks, except for Gwembe District which reported 49 percent.

Farmer/fisherfolk

Fishermen and their families throughout Zambia (a population of about 400,000) will not be significantly vulnerable to food insecurity in 1994/95, with the majority of them falling into the slightly vulnerable category. While the Department of Fisheries of MAFF reports that catches have been declining in some fisheries due to overexploitation, fishermen tend to have diversified sources of income which permit them to maintain their food security.

Fishing is a major source of income along the Zambezi, Luapula and Kafue rivers, in lakes Kariba, Tanganyika, Mweru, Mweru-Wantipa, and Bangweula, and in the Lukanga and Bangweula swamps (see Map 5). Fishing provides income and employment opportunities and is a source of high nutritional value as an accompaniment to staple foods. National production has averaged over 60,000 MT per year during the last decade, slightly more than 8 kilograms per capita.

Fishing in Zambia is divided into two sectors: the commercial and the small scale. Commercial fishing is found in Lakes Tanganyika (Northern Province) and Kariba (Southern Province) and is characterized by the capital intensive use of large vessels for offshore fishing, hired laborers, ring nets, and refrigeration for storage of catches. Small scale fishermen, on the other hand, are found in all of the major lake and river fisheries in Zambia and make their catches inshore using small vessels (banana boats and canoes) and small nets (seine and

gill nets). Small scale processing of fish catches is by smoking and sun drying.

Small-scale fishermen reside in fishing camps for much of the year, often without their wives and children. The fishing camps are mobile, shifting from one area to another as catches rise or decline. Government services such as roads, schools and health facilities are difficult to construct for these mobile populations and consequently are unavailable to them in most cases.

Fishing is not used as a sole source of income for fishermen anywhere in Zambia. They supplement their catches with income from farming, the provision of water transport, trading, and the small scale production of boats. Most fishermen use their income from fish sales to purchase maize meal, cassava, millet, etc., or barter by exchanging their catches for secondhand clothes or other items.

Between December 1 and the 28th of February of the following year, the Department of Fisheries closes all fisheries except Lake Kariba, to allow for fish breeding when water levels rise in rivers and lakes. Where enforced, this leads to a reduction in fishermen's incomes. Fishermen either illegally continue to catch or, as most do, diversify into agricultural activities during this period.

The Department of Fisheries of MAFF confirms that fisheries at Lake Bangweulu, Lake Mweru wa Ntipa, the Lukanga swamps and along the Upper and Lower Zambezi River, are experiencing declines in catches. This is attributed to low fish stocks resulting from over fishing by increasing numbers of fishermen. The Department of Fisheries plans to improve enforcement of the annual fishing season closure, and better control fish net mesh sizes.

Urban Poor

Zambia is one of the most urbanized of sub-Saharan African countries, with about 40 percent of its population living in urban areas. The majority of these are concentrated in Lusaka, with a population of over one million, and the cities of Copperbelt Province, where most mining activities (the traditional mainstay of Zambia's economy) are located.

Over 1,200,000 urban Zambians are poor with 750,000 comprising the "core" poor whose annual income is 30 percent below the poverty line.¹¹ While the current FEWS terminology for vulnerability assessments does not include specifically the classification of urban populations, this core group of the urban poor can be described as moderately to highly vulnerable. They are often constrained by frequently changing employment opportunities to reduce their food consumption, borrow money from family, neighbors and merchants, engage in time-consuming, low-profit activities such as stone crushing, and liquidate assets—all coping strategies and behavior of moderately and highly vulnerable rural populations.

The general economic decline which has characterized the last two decades in Zambia has had its greatest impact in the urban areas. Earnings from formal sector employment have dropped considerably, and in 1991 they were only 30 percent of the 1975 level.¹¹ Inflation in 1992 and 1993 was close to 200 percent. Employment in the formal sector has declined consis-

tently, with layoffs in the mining and manufacturing sector being particularly sharp (from 24 percent of the labor force in 1980 to less than 10 percent in 1990). Social services such as schools and health services are underfunded and overcrowded. The purchasing power of urban Zambians' has fallen considerably.

Inflation in 1994, however, has been greatly reduced from previous years (less than 35 percent from January through September 1994) and real Gross Domestic Product increased 4 percent in 1993, the first time in five years that GDP growth has exceeded the estimated population growth rate of about 3 percent. Recently, growth has been noted in the agricultural, wholesale, retail trade, transport, storage, communications, real estate, and services sectors. The mining, manufacturing, utility, and construction sectors all registered decreases in output. Additional positive economic indicators may help in improving food security in the future for urban populations, but the impact is unlikely to greatly reduce the numbers of food insecure urban Zambians in 1994/95.

CONCLUSIONS

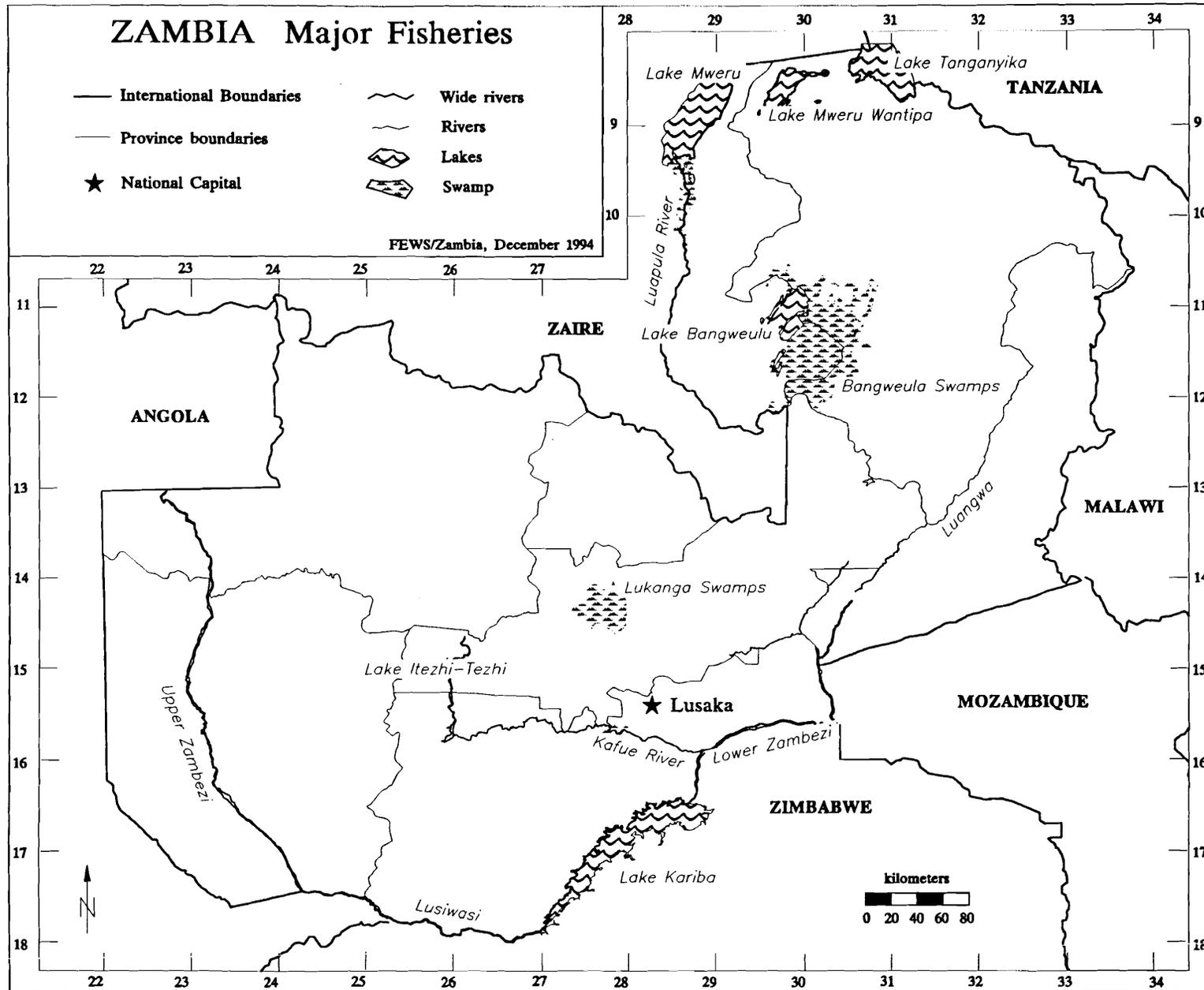
Low food stocks, reduced access to water for human and livestock consumption, and difficult access to agricultural inputs have increased levels of vulnerability in Zambia. The poorly distributed, below average rainfall of 1993/94—exacerbated by input distribution and marketing problems—contributed to these conditions and have left approximately 1–1.25 million rural Zambians moderately to highly vulnerable to food insecurity. Though the low-rainfall regions of the Luangwa, Luano, and Gwembe valleys have the highest proportion of vulnerable rural Zambians (about three quarters of the region's population), large numbers of vulnerable people are also found throughout the low- and medium-rainfall plateau areas of southern Zambia.

Relief food distribution through PAM and other Zambian NGOs, and an emergency water supply program, have been undertaken in response to these food security problems. These interventions should prevent large increases in malnutrition and the migration of rural populations to urban areas. But many of the conditions which led to higher levels of vulnerability in 1994/95 have not yet been adequately resolved and could further complicate efforts to reduce food insecurity during 1995. Small-scale farmers' assets have not been sufficient to ensure their access to agricultural inputs this year. Also, the distribution of seeds and fertilizer in isolated areas where the most vulnerable populations live has been erratic and often untimely.

The transition to liberalized agricultural markets continues without SSFs having yet fully adapted to the changed conditions, e.g., moving away from high bulk, low value crops such as maize in areas where transport costs make their production uneconomical and storage for later sales is limited. To add to the difficulties farmers face this season, forecasts for this year's rainy season report a high probability of another below-average year in which rains could end earlier than normal. Development of the agricultural season, agricultural market activity, and SSFs' adaptations to these forces will determine

Map 5. Zambia: Major Fisheries

ZAMBIA



changes in vulnerability and food security for significant numbers of rural Zambians.

METHODOLOGY APPENDIX

The FEWS 1994 Vulnerability Assessment of Zambia—is the first for the country and a collaborative effort between FEWS, the World Food Programme, and ten other governmental and nongovernmental organizations¹²—examined nine indicators of vulnerability grouped into three major composite indicators:

- Crop Risk
- Market Access and
- Coping Capacity/Assets

These indicators, representing long-term averages, base-line data from the 1990 Agricultural Census of Zambia, and current information from the FHANIS Food Security Monitoring System were used to assess both chronic and current vulnerability in an overall vulnerability assessment of Zambia.

Crop Risk was analyzed by using data on the average length of vegetative seasons¹³ and a measure of share of drought resistant crops to all crops (cassava, sorghum, and millet) harvested in each district. Market Access was measured by calculating average relative cost of access within each district to district markets, and to the major urban markets of the Copperbelt and Lusaka. Coping Capacity/Assets was assessed using data on livestock ownership, fisheries production, proportion of female-headed households, staple food energy production per capita, and current percentages of rural households with less than one month's staple food stocks.

Each composite indicator was constructed by averaging the z-scores of its component indicators. All indicators were analyzed in such a way that negative z-scores referred to *higher* levels of vulnerability (e.g., a higher percentage of female-headed households or a lower number of per capita Tropical Livestock Units) and positive z-scores referred to *lower* levels of vulnerability (e.g., higher per capita staple food energy production or lower average transportation costs within a district to the nearest major urban market).

Use of the z-score allowed comparison amongst indicators using different scales of measurement (e.g., tropical livestock units per capita, percentage of households with female heads, average relative cost of market access, etc.) which otherwise would not have been possible. Using three composite indicators prevented weighing Coping Capacity/Assets, with five indicators, more heavily than Market Access which is measured using only two indicators. The final vulnerability index was created by summing the three composite indicators.

Table ZA-A1. 1994 Vulnerability assessment indicators

Crop Risk Indicators

- Average length of vegetative season *
- Share of drought resistant crops (sorghum, millet, and cassava) in 1990 **

Market Access Indicators

- Average cost of travel to nearest District market ***
- Average cost of travel to nearest major urban market ***

Coping Strategies/Assets Indicators

- Per capita tropical livestock Units in 1990 **
- Per capita fisheries production from 1984 to 1993
- Staple food energy production per capita in 1990 **
- Percentage of female-headed households in 1990 **
- Average percentage of households with less than one month's staple food stocks in 1993/94 ****

Sources:

- * = Agro-Ecological Zones in Zambia, W.J. Veldkamp, et al. (1984, Soil Survey Unit, MAFF)
- ** = 1990 Agricultural Census of Zambia
- *** = FEWS/Zambia - Dept of Roads Analysis (June 1994)
- **** = FHANIS Food Security Monitoring System

Endnotes

1. The agricultural season in Zambia runs from July 1st to June 30th of the following year.
2. Farmers in Zambia who cultivate less than five hectares of land are classified as small-scale for purposes of official data collection. Some governmental and non-governmental agencies divide small-scale farmers into "resource poor farmers"—those with less than 2 hectares of cultivated land—and "vulnerable farmers" who have from 2 to 5 hectares of cultivated land. This subdivision of small-scale farmers is for descriptive and conceptual purposes and no breakdown of population or production statistics based on it is available.
3. The Ministry of Agriculture, Food and Fisheries officially classifies farmers who cultivate from 5 to 20 hectares as emergent farmers and those who cultivate more than 20 hectares as commercial.
4. Salaula—secondhand clothes—are commonly traded for cassava, maize, sorghum, and other crops in isolated areas of the country with poor access to agricultural markets. Usually, the actual value of the clothes is less than the cash amount being paid elsewhere for the same crops.
5. For equivalent quantities of dried white maize kernels and fresh bitter cassava, maize has more than twice the calories, eight times the protein, twice the iron, and eight times the thiamin of the cassava. Maize meal and cassava flour have roughly equal caloric value, but cassava flour remains a relatively poor source of protein and micronutrients.
6. The provincial figures are: Central (19.74 percent), Copperbelt (20.74 percent — based only on Ndola Rural District statistics), Eastern (31.71 percent), Luapula (28.00 percent), Lusaka (26.53 percent), Northern (29.94 percent), Northwestern (33.61 percent), Southern (27.17 percent), and Western (29.03 percent).
7. Tropical Livestock Units are calculated at the rate of five sheep, goats, or pigs to one head of cattle. This permits the comparison between regions with different preferences or comparative advantages in livestock ownership.
8. All household food stock data in this report are from the Food, Health and Nutrition Information System (FHANIS) Project reports (July 1993 to September 1994).
9. The line of rail and the major trunk routes running from Lusaka to Chipata in Eastern Province, Livingstone in Southern Province, and Mongu in Western Province provide the easiest and least expensive access to the major urban markets of the Copperbelt, Kitwe, and Lusaka.
10. Some farmers in isolated areas are reported to have traded 90 kg bags of maize for K2,000 worth of secondhand clothes, while farmers along the major trading routes were receiving from K6,000 to K8,000 for the same quantity of maize.
11. Statistics in the section are from the World Bank's Draft Poverty Assessment for Zambia (August 1994).
12. FEWS/Zambia gratefully acknowledges the valuable contributions of its collaborators in producing the 1994 Vulnerability Assessment of Zambia. They are: the World Food Programme, the Programme Against Malnutrition (PAM), the Food, Health and Nutrition Information System (FHANIS) Project, the Early Warning Unit of the Ministry of Agriculture, Food and Fisheries (MAFF), the Adaptive Research Planning Team (MAFF), the Zambia Meteorological Department, CARE International in Zambia, the Central Statistical Office, the National Food and Nutrition Commission, the Agricultural Marketing Information Centre (MAFF), and the Community Monitoring and Management Unit (CMMU) of the Department of Water Affairs.
13. Source: Soil Bulletin No. 9, "Agro-Climatic Zones in Zambia" by W. J. Veldkamp, et al (1984, Soil Survey Unit of the Department of Agriculture, MAFF).

Acronyms and Glossary

AMIC	Agricultural Marketing Information Centre (Ministry of Agriculture, Food and Fisheries)	FHANIS	Food Security, Health and Nutrition Information System
CSO	Central Statistical Office (National Commission for Development Planning)	GRZ	Government of the Republic of Zambia
CUSA (Z)	Cooperative Union and Savings Association, Zambia	HEPS	High Energy Protein Supplement
CMMU	Community Management and Monitoring Unit (Department of Water Affairs)	MAFF	Ministry of Agriculture, Food and Fisheries
DWA	Department of Water Affairs (Ministry of Energy and Water)	MCDSS	Ministry of Community Development and Social Services
FAO	Food and Agriculture Organization of the United Nations	NEWS	National Early Warning System
FEWS	Famine Early Warning System Project (United States Agency for International Development)	NGO	Non-Governmental Organization
		PAM	Programme Against Malnutrition
		TLU	Tropical livestock unit
		ZAMSEED	Seed Company of Zambia
		ZCF/FS	Zambia Cooperative Federation, Financial Services Division

Map 6. Zimbabwe: Districts



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Declining Food Security Among the Poorest

Based on a report released by FEWS/Zimbabwe on December 15, 1994

SUMMARY

Nearly 1.04 million people are highly vulnerable to famine in southern Zimbabwe. There is an ongoing food-for-work relief assistance operation in these areas that is now providing 4-5 kilograms/person/month to 1.1 million people. This, and the relatively large stocks of grain and low grain prices in the country, indicate that even in the event of a poor 1994/95 harvest, widespread food shortages and famine would be unlikely before the end of 1995. However, current information on El Niño Southern Oscillation (ENSO) events could change this outlook. If the strength of the ENSO event continues to increase, significant crop losses and consequent supply problems could result.

METHODOLOGY

In this assessment, vulnerability is assumed to be strongly correlated with the amount and variability of income from agriculture and in-kind transfers. Other important components of vulnerability that were also measured here include: level of development/asset ownership, crop risk, and observed stress. Pertinent indicators within each component were measured, indexed, and ranked, before finally using an average of the four component rankings to construct a final ranking of relative baseline vulnerability (see Table 3 [1 is the worst, 171 the best]). Table ZM-A2 shows the indicators that have been used to measure each component. Finally, recent data and income from agriculture and in-kind transfers were combined with the baseline vulnerability ranking to identify communal lands in which food security is low and recently declining, and therefore of particular concern (see Table 3).

ANALYSIS OF SOCIOECONOMIC GROUPS

This vulnerability assessment focuses on the rural "communal" sector of the country (more than 50 percent of total population). There are currently about 171 communal land (CL) areas in the country (see Map 7). Although recent changes in the Government's administrative structure make these administrative units largely unofficial, several important and lengthy datasets continue to be based upon them (e.g., agricultural and cash crop production, livestock census) and they form the basis for this vulnerability assessment (see Map 8).

People in these communal areas are largely farming or

mixed-farming (agriculture and livestock raising) based. More than 70 percent of the farmers typically have some animal holdings. Other, possibly significantly vulnerable, socioeconomic groups not assessed here include commercial farm laborers and the urban poor. The number, characteristics, and conditions of commercial farm laborers are not easily available, although anecdotal and one-off studies indicate that their food security and poverty level may be worse than the communal sector population. General economic and demographic data regarding the situation and number of the urban poor are also not available, though their presence is noted.

Baseline Vulnerability Rankings

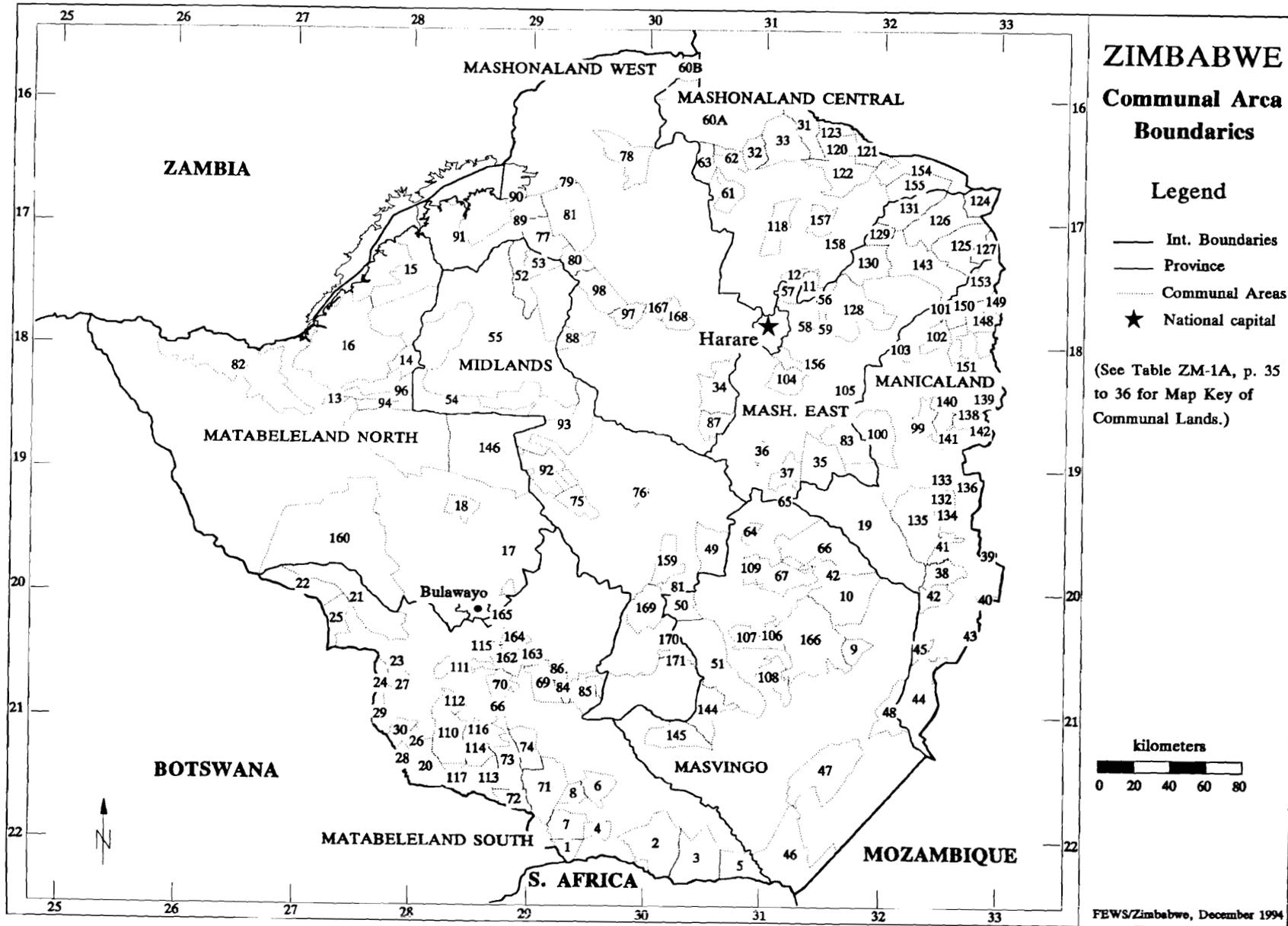
The most vulnerable communal area using the baseline measurements is Siyoka, in Beitbridge District (see Maps 7-8). Although this communal area has livestock and assets in an amount that is average for all communal areas, it is the fifth lowest in income from agriculture and in-kind transfers, ninth most risky in crop risk, and twelfth most stressed. The second and third most vulnerable are Matibi I and Maranda communal areas in Mwenezi District. Mashava South in Chivi District was ninth most vulnerable. All of these areas are found in close proximity in southwestern Zimbabwe.

The least vulnerable communal areas are found in the north-center of the country. Regular and plentiful rains, substantial staple food and cash crop production, modest assets and level of development, as well as a significant livestock presence, give the lowest vulnerability to Kunzwi in Goromonzi District.

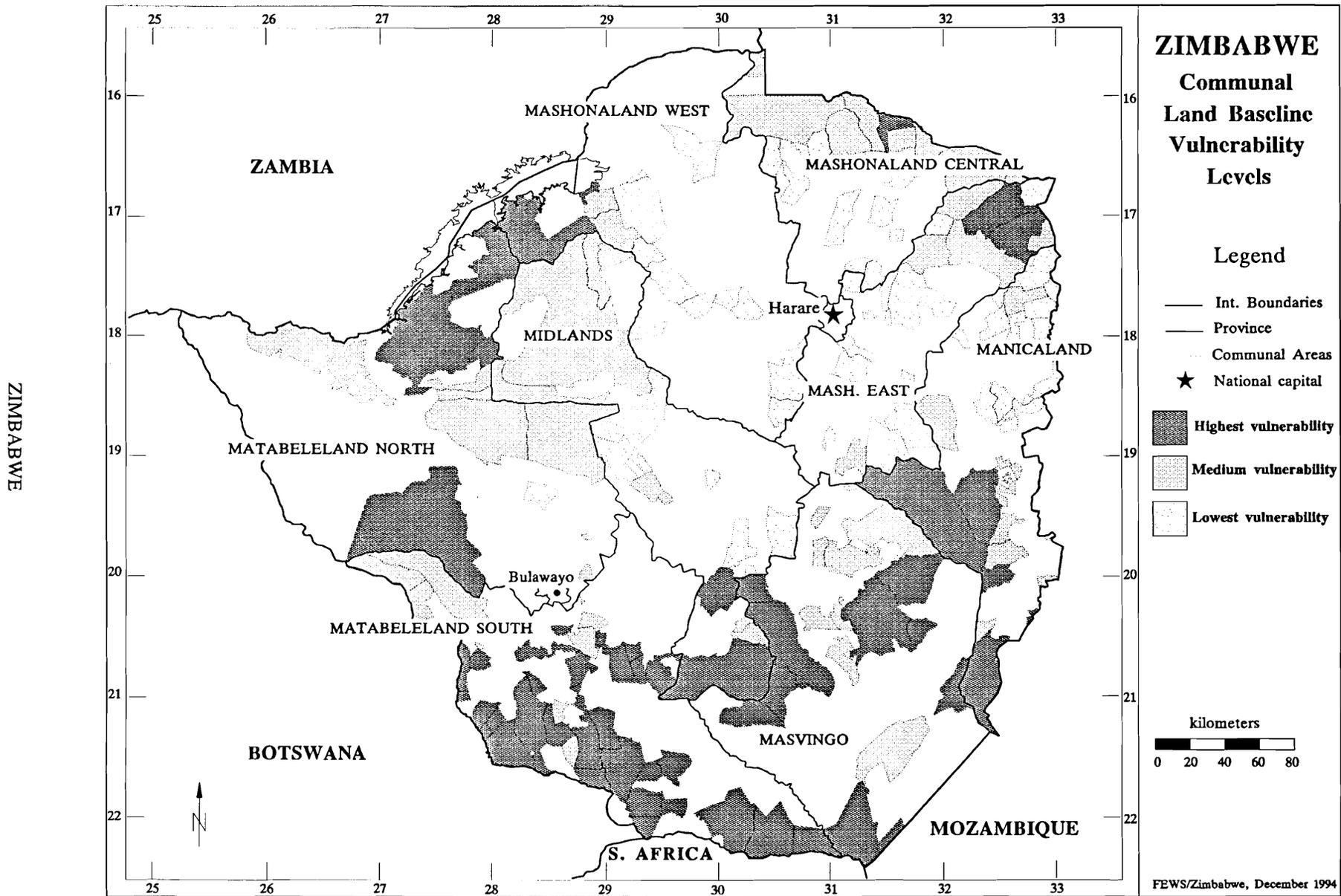
The analysis of baseline agricultural income (including food for work transfers) found a range of average annual per capita income from agriculture and in-kind transfers (adjusted for inflation to 1994 values) running from a high of Z\$1,830 in Mukumbura West (Centenary District), to a low of Z\$61 in small Chikukwa (Chimanimani) (see Table 3). The median annual per capita income from agriculture and in-kind transfers was approximately Z\$300.

At the extremes of both the high and low ends of this scale, there is evidence that data problems are distorting the results. Nevertheless, outside of these anomalies, a consistent, and somewhat expected, picture of low income levels is shown in the low rankings of several communal areas in Matabeleland South Province (Ngulube, Siyoka, Mphoengs, Mzinyatini). Agricultural production in these areas is low and highly variable. The lowest per capita value of staple crop production of any communal area (adjusted for inflation) is Z\$ 18.59 in Siyoka (Beitbridge District). Siyoka also has very little reported cash crop production. Even though livestock resources are much higher in Siyoka than elsewhere, the estimated average annual

Map 7. Zimbabwe: Communal Area Boundries



Map 8. Zimbabwe: Communal Land Baseline Vulnerability Levels



off-take rate of 5 percent for all animals limits the baseline per capita contribution of this sector to an approximately Z\$ 35-75 in this and other nearby areas, not an exceptional contribution to total income for most of the communal lands.

Also found in the bottom ten communal areas in per capita production are several communal areas lying on the southern shore of Lake Kariba (Manjolo, Omay, Gatshe Gatshe, and Siabuwa). Besides showing a low average of agricultural production, these areas had only limited livestock holdings until recently because of tsetse (*trypanosomiasis*) infested woodland pasture areas. Tsetse eradication programs have brought some areas under control. As the increasing livestock numbers show in the current assessment, income levels from livestock are rising in these areas.

Half of the ten highest income communal lands are found where cash crops, particularly cotton, are present. Gandavaroyi and Sebungwe (Gokwe District), Mukumbura West and Gutsa (Centenary), and Sanyati (Kadoma) are all heavy cotton producers.

Some income data (remittances, wage income, and fishing production) which were not available for this assessment, or at all, would undoubtedly change the rankings of many of the lowest income areas. The typical Matabeleland South communal area shows high rates (50–60 percent) of female-headed households, reflecting the widespread practice that husbands emigrate to neighboring South Africa and Botswana for work. Assuming a relatively modest annual remittance to the household of Z\$50–75 per capita, the bottom ten Matabeleland South communal lands could move up 20–30 places. Similarly, Gatshe Gatshe is a fishing economy, so its low ranking here is largely a defect of no data available on its principal economic activity.

The Zimbabwe Government's Drought Relief Programme—food-for-work grain distributions—have been a feature of many communal areas since 1982. An average of over 1.2 million communal sector residents receive drought relief rations of 5 kg or more per month on average in any year. The average annual per capita value (adjusted for inflation) of the food distributed runs from Z\$6 to Z\$55. While this may seem a minor per capita input compared to crops or livestock, it should be noted that this amount generally is not spread across the entire population of an area, as it is measured here, but usually goes to the poorest in an area. It is, therefore, a more meaningful income for many. It comprises 33 percent of the measurable income in some of these areas.

VULNERABILITY OF SOCIOECONOMIC GROUPS

Vulnerability Component: Level of Development/Asset Ownership

Of the ten lowest-income communal areas, only the four on the shore of Lake Kariba (Siabuwa and Manjolo, Omay, and Gatshe Gatshe, in Binga, Omay, and Kariba districts, respectively) were found at the bottom of this ranking. Others at the

lower end include communal areas from Gokwe District, and several from the Zambezi Valley. These are generally areas that are inhospitable to cattle, relatively unproductive in agriculture, or are, in Gokwe's case, areas of relatively recent expansion of farming and population increase.

The highest-ranked communal areas in terms of level of development/asset ownership are areas that are in the relatively prosperous agricultural zones of Goromonzi, Zwimba, Chegutu, and Chikomba districts. The high scores tend to confirm the impression of a sustained and relatively unvarying income pattern.

Surprisingly, many of the low-income communal areas from Matabeleland South fared quite well on this factor ranking. They fared well not only because of substantial, but not preponderant, livestock holdings, but also because of high scores on the level of development index. Half of the sixteen highest scores on the level of development index came from communal areas in Matabeleland South, particularly in Umzingwane and Insiza districts. Looking at other, quite low factor rankings, the high level of development scores would appear to be the result of factors other than a pattern of income based upon agriculture or livestock.

Vulnerability Component: Crop Risk

Looking at the crop risk rankings, there is no question where the most frequent and severe shocks to food security are centered. Out of the bottom (most vulnerable) forty communal areas, well over thirty of them are found in Matabeleland South Province. The Limpopo River watershed that covers much of the province has the lowest mean annual rainfall of all the watersheds (approximately 453 mm), is affected by drought (less than 75 percent of mean annual rainfall) approximately one out of every four years, and has the highest degree of inter-annual variability in its mean rainfall totals. Surprisingly, almost all of the ten watersheds appear to suffer from drought at least one of every five years. Even the northern Hunyani (14 percent of mean annual rainfall) and Mazowe (18 percent) watersheds, and the (eastern) Border watershed have just slightly less than a one-in-five year history of drought.

Vulnerability Component: Observed Stress

Those districts showing the greatest baseline of participation in the drought relief feeding programme include communal areas in southcentral Zimbabwe. The following districts all have extremely high percentages of their population receiving assistance: Mberengwa (Mberengwa, 52.2 percent), Maranda and Matibi I (Mwenezi, 47.1 percent), Runde, Mazvihwa, and Ungova (Zvishavane, 44.7 percent), and Chivi and Mashava South (Chivi, 44.2 percent).

The communal areas which show the least level of observed stress are those found in the prime agricultural areas of the northeast. They include Chiweshe (Mazowe District), with an average of only 3.9 percent of its population normally eligible to receive assistance, Chinyika, Chikwaka, Kunzwi, and Chinamora (Goromonzi, 5.3 percent), and Musana and Masembura (Bindura, 5.3 percent).

Current Vulnerabilities

The value of the most important indicators of agricultural and livestock off-take incomes were computed for the three most recent years (1991/92, 1992/93, and 1993/94), and then compared to the baseline period (generally 1980-91). Table 3 summarizes these data and identifies:

- Those communal lands with highest baseline vulnerability
- Those where there have been significant declines of at least 33 percent in either, or both, of their agricultural production or livestock off-take values

The table illustrates it is clear that the last three years have been difficult ones, particularly in the southern third of the country, and especially in Matabeleland South. In the last three years, the greatest drought of the century in 1991/92 was followed by an excellent rainy season, and then by a year in which poor farmers saw their late planted crops devastated by an early termination of the rains. Within the third group of highest baseline vulnerability, 33 of the communal lands had significantly declining income from agriculture and in-kind transfers in the current period (see Table 4 and Map 9). Twenty-two of these are found in Matabeleland South Province. Even if incomes from those sources, that are difficult to measure (remittances, wages, craft sales, etc.), were added, the line between maintenance of health and the slow spiral of deteriorating food security appears very narrow in these lowest-ranked communal lands.

On the basis of the data shown here, as well as other anecdotal information, it is apparent that a substantial number of communal sector households in the southern half of the country fall under the FEWS Matrix (see Page 38) definition of highly vulnerable. This means that modes of production and behavior are being modified in response to food stress (probably higher rates of emigration, etc.), and there is a progressive disinvestment of household assets of lesser importance. This is the stage where the margin of safety that can cushion further shocks is being substantially eroded. Useful assistance to populations at

this stage of vulnerability is help in maintaining their asset base and monitoring the impact on health of reduced food intake. It is perhaps necessary to note that there is no evidence of widespread or exceptional rates of malnutrition, much less starvation, in these areas. Nevertheless, it is also clear that there are few data available regarding the current nutritional status of these populations.

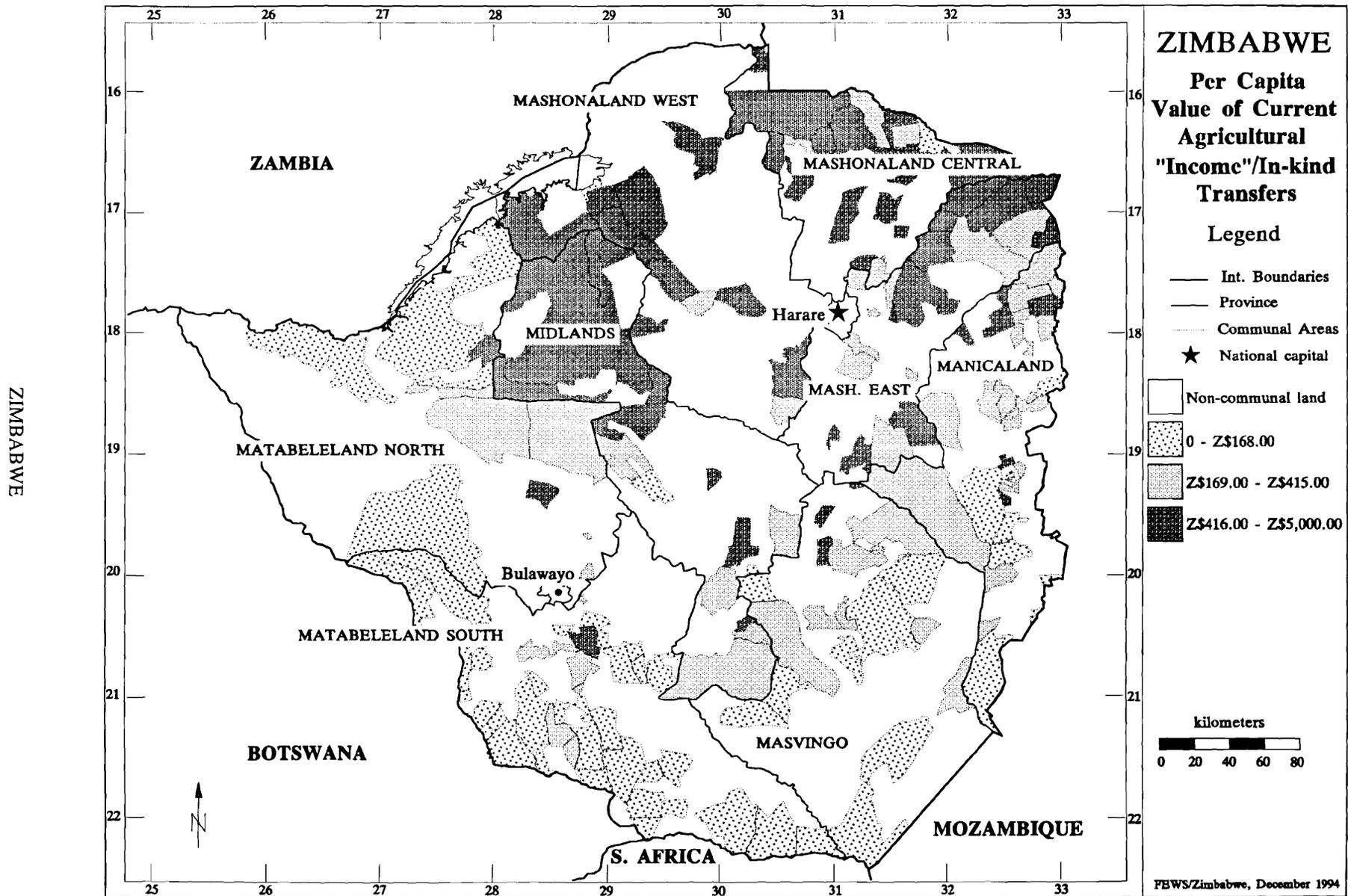
CONCLUSIONS

How many people may be highly vulnerable? The total population of the 58 communal areas of greatest vulnerability is approximately 2.07 million. Although wealth distribution data are not currently available for these areas, it is probable that not more than 50 percent (1.04 million) of the inhabitants of these areas may be experiencing significant difficulty in producing or acquiring sufficient food.

Recently, an assessment was made of the number of people receiving Drought Relief Programme food-for-work rations (of about 4–5 kg per person in November 1994) in the districts where most of the most vulnerable populations are found (all districts in Matabeleland South and Masvingo Provinces, Mberengwa and Zvishavane districts in Midlands Province, and Mutare and Chipinge districts in Manicaland). In all, 1.10 million recipients were found. This is quite close to the above estimate of 1.04 million.

The national grain stocks are currently quite large, and grain prices are relatively low. There is an ongoing food relief operation providing aid to almost 2 million people. It is likely that the country can meet current or even, in the case of a poor 1994/95 harvest, greatly expanded numbers of food insecure people during 1995. In the worst case, there will be sufficient lead-time to organize additional assistance if necessary.

Map 9. Zimbabwe: Per Capita Value of Agricultural Income and In-kind Transfers



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Table 3. Zimbabwe: Baseline vulnerability scores and rankings

District	Communal land	Income from agriculture and in-kind transfers	Index of the level of development and asset ownership	Crop risk	Observed stress	Average	Rank
Beitbridge	Siyoka	5	82.0	9.5	12.5	27.3	1
Mwenezi	Matibi I	39	24.0	52.0	2.5	29.4	2
Mwenezi	Maranda	60	26.0	36.0	2.5	31.1	3
Beitbridge	Dendele	38	78.5	3.5	12.5	33.1	4
Beitbridge	Machuchuta	16	103.5	1.0	12.5	33.3	5
Beitbridge	Mtetengwe	29	90.0	13.0	12.5	36.1	6
Beitbridge	Maramani	24	105.0	3.5	12.5	36.3	7
Beitbridge	Masera	31	106.5	2.0	12.5	38.0	8
Chivi	Mashava South	44	74.5	32.0	7.5	39.5	9
Beitbridge	Diti	26	98.5	26.5	12.5	40.9	10
Beitbridge	Chipise	21	97.0	34.0	12.5	41.1	11
Kariba	Omay	4	6.0	109.0	47.0	41.5	12
Mberengwa	Mberengwa	76	42.0	51.0	1.0	42.5	13
Zaka	Ndanga	30	19.5	89.5	35.0	43.5	14
Matobo	Kumalo	17	101.0	38.0	20.5	44.1	15
Chipinge	Ndowoyo	15	38.0	72.0	56.5	45.4	16
Mount Darwin	Mukumbura East	22	34.0	48.0	81.5	46.4	17
Bulilimangwe	Mphoengs	7	56.0	18.0	105.0	46.5	18
Kariba	Gatshe Gatshe	6	9.5	129.0	47.0	47.9	19
Gwanda	Gwanda	12	134.0	17.0	31.0	48.5	20
Binga	Manjolo	30	119.0	69.5	50.0	21.0	21
Binga	Lubumbi	27	31.5	79.5	69.5	51.9	22
Gwanda	Dibilishaba	28	148.0	6.0	31.0	53.3	23
Tsholotsho	Tsholotsho	37	18.0	70.5	89.0	53.6	24
Binga	Siabuwa	10	1.0	136.0	69.5	54.1	25
Chivi	Chivi	98	62.5	53.0	7.5	55.3	26
Matobo	Semukwe	64	130.0	8.0	20.5	55.6	27
Matobo	Tshatshani	66	116.0	20.5	20.5	55.8	28
Buhera	Save	94	48.0	57.0	27.0	56.5	29
Matobo	Gulati	43	106.5	58.0	20.5	57.0	30
Bulilimangwe	Ngulube	3	57.0	65.0	105.0	57.5	31
Insiza	Insiza	42	139.0	7.0	50.0	59.5	32
Bikita	Bikita	80	41.0	93.0	25.5	59.9	33
Bikita	Matsai	61	39.5	121.5	25.5	61.9	34
Chiredzi	Sangwe	23	113.5	59.0	53.0	62.1	35
Gwanda	Matshetshe	52	152.0	14.5	31.0	62.4	36
Insiza	Glassblock	62	124.0	14.5	50.0	62.6	37
Gwanda	Gwaranyemba	41	160.0	24.0	31.0	64.0	38
Mudzi	Ngarwe	88	8.0	70.5	90.5	64.3	39
Bulilimangwe	Ramakwebane	48	94.5	11.0	105.0	64.6	40
Matobo	Mambali	70	146.0	23.0	20.5	64.9	41
Mudzi	Mudzi	50	3.5	118.0	90.5	65.5	42
Matobo	Mbongolo	81	140.5	20.5	20.5	65.6	43
Chiredzi	Sengwe	25	142.5	45.0	53.0	66.4	44
Bulilimangwe	Brunapeg	63	88.5	9.5	105.0	66.5	45
Bulilimangwe	Mpande	58	77.0	26.5	105.0	66.6	46
Mutare	Marange	93	64.0	68.0	42.5	66.9	47
Gwanda	Makwe	46	162.5	29.0	31.0	67.1	48
Umzingwane	Nswazi	13	140.5	44.0	73.5	67.8	49
Insiza	Godlwayo	51	158.0	12.0	50.0	67.8	50
Gwanda	Shashi	72	164.5	5.0	31.0	68.1	51
Chipinge	Mutema	53	37.0	133.0	56.5	69.9	52
Zvishavane	Runde	69	142.5	63.5	5.0	70.0	53
Bulilimangwe	Sansukwe	68	92.0	16.0	105.0	70.3	54
Binga	Busi	74	29.5	108.0	69.5	70.3	55
Chipinge	Tamandayi	32	33.0	160.0	56.5	70.4	56
Gwanda	Wenlock	65	161.0	25.0	31.0	70.5	57
Bulilimangwe	Radtladi	47	74.5	60.0	105.0	71.6	58
Zvishavane	Ungova	79	156.0	47.0	5.0	71.8	59
Chiredzi	Matibi II	59	136.0	42.0	53.0	72.5	60
Centenary	Muzarabani	107	12.0	97.0	77.0	73.3	61
Mount Darwin	Masoso West	40	29.5	143.0	81.5	73.5	62

Table 3. Zimbabwe: Baseline vulnerability scores and rankings (continued)

District	Communal land	Income from agriculture and in-kind transfers	Index of the level of development and asset ownership	Crop risk	Observed stress	Average	Rank
Bulilimamangwe	Ingwezi	87	78.5	28.0	105.0	74.6	63.0
Kariba	Kanyati	122	7.0	125.0	47.0	75.3	64.0
Bubi	Inyati	11	69.5	66.0	154.5	75.3	65.0
Chipinge	Musikavanhu	57	39.5	150.0	56.5	75.8	66.0
Mutare	Rowa	54	71.0	139.0	42.5	76.6	67.0
Gokwe	Kana	123	23.0	79.5	86.5	78.0	68.0
Mutoko	Mutoko	56	53.5	74.0	130.0	78.4	69.0
Masvingo	Zimutu	109	133.0	35.0	37.5	78.6	70.0
Chimanimani	Chikukwa	1	51.0	151.0	112.5	78.9	71.0
Masvingo	Nyajena	55	113.5	111.0	37.5	79.3	72.0
Matobo	Maribeha	131	147.0	9.0	20.5	79.4	73.0
Chimanimani	Ngorima	8	49.5	14.0	112.5	79.8	74.0
Mutare	Chinyauwhera	96	60.0	121.5	42.5	80.0	75.0
Hwange	Hwange	14	119.0	104.0	84.0	80.3	76.0
Rushinga Masoso	East	97	2.0	156.0	66.5	80.4	77.0
Lupane	Lupane	35	61.0	99.5	128.0	80.9	78.0
Centenary	Mukumbura West	171	16.0	62.0	77.0	81.5	79.0
Gweru	Manyame	19	131.0	56.0	123.5	82.4	80.0
Zvishavane	Mazvihwa	129	157.0	39.0	5.0	82.5	81.0
Chikomba	Nharira	102	137.5	33.0	60.0	83.1	82.0
Mutare	Dora	111	55.0	126.5	42.5	83.8	83.0
Mutare	Muromo	110	49.5	134.0	42.5	84.0	84.0
Umzingwane	Esiphezini	71	167.0	31.0	73.5	85.6	85.0
Hurungwe	Rengwe	99	15.0	67.0	162.0	85.8	86.0
Masvingo	Mtirikwi	103	125.0	78.0	37.5	85.9	87.0
Umzingwane	Mzinyatini	9	17.5	123.5	73.5	85.9	88.0
Mutare	Zimunya	78	8.5	135.0	42.5	86.0	89.5
Unguza	Ntabazinduna	18	151.0	30.0	145.0	86.0	89.5
Gutu	Chikwanda	136	19.5	43.0	63.5	88.0	91.5
Umzingwane	Matopo	75	16.5	41.0	73.5	88.0	91.5
Lupane	Mzola	92	72.5	61.0	128.0	88.4	93.0
Masvingo	Masvingo	124	11.0	82.5	37.5	88.8	94.0
Matobo Seear	Block	164	150.0	22.0	20.5	89.1	95.0
Bulilimamangwe	Mpimbila	127	80.0	46.0	105.0	89.5	96.0
Lupane	Dandanda	89	66.0	77.0	128.0	90.0	97.0
Mount Darwin	Chiswiti	95	31.5	157.0	81.5	91.3	98.0
Chimanimani	Mutambara	36	87.0	130.5	112.5	91.5	99.0
Murehwa (UMP)	Pfungwe	130	17.0	103.0	118.0	92.0	100.0
Gutu	Gutu	146	108.0	55.0	63.5	93.1	101.0
Rushinga	Chimanda	151	3.5	152.5	66.5	93.4	102.0
Gokwe	Gokwe	160	25.0	106.5	86.5	94.5	103.0
Mudzi	Chikwizo	125	27.0	137.5	90.5	95.0	104.5
Murehwa (UMP)	Uzumba	117	28.0	117.0	118.0	95.0	104.5
Nkayi	Nkayi	73	65.0	99.5	144.0	95.4	106.0
Bulilimamangwe	Maitengwe	142	82.0	54.0	105.0	95.8	107.0
Bulilimamangwe	Nata	140	93.0	49.0	105.1	96.8	108.0
Gutu	Serima	154	120.0	50.0	63.5	96.9	109.0
Gokwe	Sebungwe	169	46.0	87.0	86.5	97.1	110.0
Gurudevand	South	82	5.0	162.0	141.5	97.6	111.0
Gokwe	Gandavaroyi	166	47.0	91.5	86.5	97.8	112.0
Nyanga Saint	Swithins	83	91.0	82.5	136.0	98.1	113.0
Makoni	Chiduku	118	94.5	86.0	96.0	98.6	114.0
Chimanimani	Muwushu	33	85.5	169.0	112.5	100.0	115.0
Mount Darwin	Kandeya	144	35.0	141.5	81.5	100.5	116.0
Mutasa Mutasa	North	34	85.5	140.0	149.0	102.1	117.0

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Table 3. Zimbabwe: Baseline vulnerability scores and rankings (continued)

District	Communal land	Income from agriculture and in-kind transfers	Index of the level of development and asset ownership	Crop risk	Observed stress	Average	Rank
Mutasa	Holdenby	20	82.0	158.0	149.0	102.3	118.0
Gweru	Chiwundura	77	126.0	84.0	123.5	102.6	119.0
Bubi	Inkosikazi	49	118.0	89.5	154.5	102.8	120.0
Makoni	Makoni	121	98.5	101.0	96.0	104.1	121.0
Murehwa (UMP)	Maramba	165	22.0	114.0	118.0	104.8	122.0
Chirumhanzu	Chirumanzi	148	153.5	40.0	79.0	105.1	123.0
Kwekwe	Silobela	132	113.5	63.5	115.5	106.1	124.0
Makoni	Tanda	115	121.5	96.0	96.0	107.1	125.0
Nyanga	Nyamaropa	119	72.5	105.0	136.0	108.1	126.5
Makoni	Weya	101	103.5	132.0	96.0	108.1	126.5
Nyanga	Inyanga North	108	45.0	145.5	136.0	108.6	128.0
Nyanga	Nyanga	90	43.5	167.0	136.0	109.1	129.0
Shurugwi	Shurugwi	116	164.5	37.0	120.0	109.4	130.0
Gutu	Denhere	168	123.0	88.0	63.5	110.6	131.0
Chikomba	Save North	147	155.0	81.0	60.0	110.8	132.0
Makoni	Chikore	106	144.5	98.0	96.0	111.1	133.0
Hwedza	Wedza	120	128.0	102.0	99.0	112.3	134.0
Kwekwe	Zhombe	153	102.0	85.0	115.5	113.9	135.5
Guruve	Bakasa	139	11.0	164.0	141.5	113.9	135.5
Hurungwe	Mukwichi	113	21.0	160.0	162.0	114.0	137.0
Mudzi	Mkota	163	43.5	160.0	90.5	114.3	138.0
Hurungwe	Piriwiri	159	13.0	128.0	162.0	115.5	139.0
Chikomba	Manyeni	141	166.0	95.0	60.0	115.5	140.0
Hurungwe	Nyaodza	157	14.0	130.5	162.0	115.9	141.0
Bindura	Musana	105	67.0	126.5	165.5	116.0	142.0
Hurungwe	Hurungwe	161	52.0	91.5	162.0	116.6	143.0
Marondera	Chiota	85	153.5	76.0	156.5	117.8	144.0
Centenary	Gutsa	170	53.5	171.0	77.0	117.9	145.0
Guruve	Kachuta	149	19.5	166.0	141.5	119.0	146.0
Marondera	Svosve	67	159.0	94.0	156.5	119.1	147.0
Shamva	Bushu	104	59.0	165.0	152.5	120.1	148.0
Guruve	Guruve	158	36.0	147.0	141.5	120.6	149.5
Murehwa	Mangwende	156	69.5	111.0	146.0	120.6	149.5
Mutasa	Manyika	91	135.0	115.0	149.0	122.5	151.0
Nyanga	Zimbiti	133	84.0	137.5	136.0	122.6	152.0
Shamva	Madziwa	143	58.0	144.0	152.5	124.4	153.0
Seke	Seke	100	127.0	113.0	159.0	124.8	154.0
Mutasa	Manga	86	109.5	155.0	149.0	124.9	155.0
Kadoma	Sanyati	167	96.0	106.5	131.5	125.3	156.0
Zvimba	Zwimba	137	169.0	75.0	121.5	125.6	157.0
Goromonzi	Chinyika	45	149.0	145.5	168.5	127.0	158.0
Makonde	Mupfure	135	132.0	116.0	125.5	127.1	159.0
Nyanga	Sawunyama	150	62.5	168.0	136.0	129.1	160.0
Kadoma	Ngezi	145	100.0	141.5	131.5	129.5	161.0
Bindura	Masembura	138	68.0	148.0	165.5	129.9	162.0
Goromonzi	Chinamora	84	121.5	152.5	168.5	131.6	163.5
Zvimba	Chirau	162	170.0	73.0	121.5	131.6	163.5
Chegutu	Mondoro	134	168.0	69.0	158.0	132.3	165.0
Makonde	Magondi	155	129.0	120.0	125.5	132.4	166.0
Nyanga	Matizi	152	76.0	170.0	136.0	133.5	167.0
Goromonzi	Chikwaka	114	144.5	111.0	168.5	134.5	168.0
Mutasa	Mutasa South	126	113.5	154.0	149.0	135.6	169.0
Mazowe	Chiweshe	112	117.0	163.0	171.0	140.8	170.0
Goromonzi	Kunzwi	128	171.0	123.5	168.5	147.8	171.0

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Table 4. Zimbabwe: Current vulnerability—Changes in income from agriculture and in-kind transfers

District	Communal land	Vulnerability Terile (baseline)	Baseline \$ value	Current \$ value	Percent change	Baseline \$ value	Current \$ value	Percent change	Current per capita income
Kariba	Gatshe Gatshe	Highest	65.31	2.20	-96.6	—	—	—	2.20
Gwanda	Gwaranyemba	Highest	72.74	8.25	-88.7	88.61	37.40	-57.8	45.65
Umzingwane	Mzinyatini	Middle	57.83	16.78	-71.0	37.54	36.58	-2.6	53.35
Bulilimamangwe	Mpande	Highest	170.69	7.15	-95.8	61.22	46.68	-23.7	53.83
Chimanimani	Muwushu	Lowest	84.65	31.35	-63.0	46.79	28.96	-38.1	60.31
Gwanda	Gwanda	Highest	48.24	13.48	-72.1	58.08	47.31	-18.5	60.79
Chimanimani	Ngorima	Middle	90.64	57.75	-36.3	6.23	4.15	-33.3	61.90
Bulilimamangwe	Mphoengs	Highest	58.44	27.23	-53.4	44.15	35.98	-18.5	63.21
Bulilimamangwe	Ingwezi	Middle	266.97	16.50	-93.8	61.46	46.89	-23.7	63.39
Chipinge	Tamandayi	Highest	132.06	71.50	-45.9	5.94	3.42	-42.4	74.92
Bulilimamangwe	Ramakwebane	Highest	105.60	5.50	-94.8	102.11	69.48	-32.0	74.98
Chiredzi	Matibi II	Middle	117.76	55.28	-53.1	63.04	20.17	-68.0	75.45
Bulilimamangwe	Brunapeg	Highest	155.05	1.38	-99.1	75.02	75.46	0.6	76.84
Gwanda	Matshetshe	Highest	116.02	26.13	-77.5	75.58	58.96	-22.0	85.09
Beitbridge	Mtetengwe	Highest	92.92	33.00	-64.5	60.69	56.76	-6.5	89.76
Gwanda	Dibilishaba	Highest	66.14	17.60	-73.4	66.96	73.93	10.4	91.53
Beitbridge	Dendele	Highest	93.69	11.00	-88.3	54.59	81.69	49.6	92.69
Bulilimamangwe	Radtladi	Middle	139.34	19.25	-86.2	59.92	73.77	23.1	93.02
Insiza	Godlwayo	Highest	110.03	43.73	-60.3	54.45	50.90	-6.5	94.63
Binga	Manjolo	Highest	22.85	41.25	80.5	37.13	53.42	43.9	94.67
Chimanimani	Mutambara	Middle	118.42	65.73	-44.5	49.23	29.59	-39.9	95.32
Matobo	Semukwe	Highest	143.74	57.48	-60.0	63.65	39.13	-38.5	96.61
Binga	Siabuwa	Highest	83.99	92.13	9.7	3.42	7.33	114.1	99.45
Bulilimamangwe	Maitengwe	Middle	478.94	23.38	-95.1	62.04	76.38	23.1	99.76
Matobo	Tshatshani	Highest	160.38	63.80	-60.2	53.57	37.48	-30.0	101.28
Mutare	Marange	Highest	264.33	65.73	-75.1	37.37	36.42	-2.5	02.15
Beitbridge	Chipise	Highest	26.81	41.53	54.9	75.43	61.70	-18.2	103.22
Beitbridge	Siyoka	Highest	18.65	19.80	6.2	55.76	83.46	49.7	103.26
Mount Darwin	Masoso West	Middle	128.45	71.23	-44.6	15.07	35.74	137.1	106.96
Gweru	Manyame	Middle	68.92	59.40	-13.8	52.07	48.07	-7.7	107.47
Mutasa	Holdenby	Lowest	95.48	102.58	7.4	6.70	6.72	0.4	109.30
Bulilimamangwe	Sansukwe	Highest	146.44	10.73	-92.7	98.16	98.73	0.6	109.45
Chiredzi	Sengwe	Highest	75.32	54.45	-27.7	70.08	58.09	-17.1	112.54
Matobo	Maribeha	Middle	419.79	54.45	-87.0	85.72	59.13	-31.0	113.58
Mwenezi	Maranda	Highest	183.29	101.75	-44.5	30.86	13.13	-57.4	114.88
Hwange	Hwange	Middle	65.97	47.03	-28.7	55.44	72.01	29.9	119.03
Lupane	Dandanda	Middle	245.47	69.85	-71.5	84.45	60.57	-28.3	130.42
Matobo	Mambali	Highest	129.33	58.30	-54.9	85.53	72.85	-14.8	131.15
Beitbridge	Masera	Highest	56.79	—	-100.0	101.19	132.11	30.6	132.11
Beitbridge	Maramani	Highest	35.12	1.93	-94.5	99.98	130.64	30.7	132.56
Zaka	Ndanga	Highest	106.21	117.98	11.1	42.36	18.08	-57.3	136.06
Umzingwane	Nswazi	Highest	74.33	118.53	59.5	39.55	19.28	-51.3	137.80
Beitbridge	Diti	Highest	36.41	76.73	110.7	76.07	62.21	-18.2	138.93
Chivi	Mashava South	Highest	95.84	13.20	-86.2	71.78	126.67	76.5	139.87
Beitbridge	Machuchuta	Highest	13.09	12.38	-5.5	99.22	129.64	30.7	142.01
Masvingo	Nyajena	Middle	146.82	126.50	-13.8	41.79	20.74	-50.4	147.24
Mwenezi	Matibi I	Highest	139.40	132.00	-5.3	29.43	19.59	-33.4	151.59
Insiza	Insiza	Highest	105.99	124.03	17.0	43.75	27.61	-36.9	151.64
Matobo	Gulati	Highest	117.15	99.00	-15.5	48.13	54.19	12.6	153.19
Tsholotsho	Tsholotsho	Highest	120.92	116.05	-4.0	31.53	39.61	25.6	155.66
Bulilimamangwe	Ngulube	Highest	0.00	121.00	—	44.15	35.98	-18.5	156.98
Bulilimamangwe	Mpimbila	Middle	418.50	92.95	-77.8	61.97	65.85	6.3	158.80
Insiza	Glassblock	Highest	148.45	136.40	-8.1	32.86	24.17	-26.4	160.57
Bulilimamangwe	Nata	Middle	459.39	43.73	-90.5	99.36	118.79	19.6	162.51
Bikita	Bikita	Highest	205.12	144.10	-29.7	42.01	21.20	-49.5	165.30
Chipinge	Ndowoyo	Highest	88.11	149.05	69.2	32.78	17.33	-47.1	166.38
Gwanda	Shashi	Highest	64.82	15.68	-75.8	133.72	151.26	13.1	166.94
Chipinge	Mutema	Highest	194.48	156.48	-19.5	30.44	15.32	-49.7	171.79
Goromonzi	Chinamora	Lowest	243.95	135.30	-44.5	25.95	38.39	48.0	173.69
Mutare	Zimunya	Middle	177.90	164.45	-7.6	55.58	9.36	-83.2	173.81
Chipinge	Musikavanhu	Middle	158.18	157.30	-0.6	38.60	16.94	-56.1	174.24
Mberengwa	Mberengwa	Highest	179.38	151.25	-15.7	38.14	27.25	-28.6	178.50

Table 4. Zimbabwe: Current vulnerability—Changes in income from agriculture and in-kind transfers (continued)

District	Communal land	Vulnerability Tercile (baseline)	Baseline \$ value	Current \$ value	Percent change	Baseline \$ value	Current \$ value	Percent change	Current per capita income
Matobo	Kumalo	Highest	60.31	125.13	107.5	45.44	54.29	19.5	179.41
Bikita	Matsai	Highest	183.26	169.95	-7.3	40.26	9.82	-75.6	179.77
Mutasa	Mutasa South	Lowest	382.86	120.73	-68.5	48.58	60.86	25.3	181.58
Zvishavane	Ungova	Middle	193.79	142.18	-26.6	48.13	46.75	-2.9	188.93
Mutare	Rowa	Middle	167.15	163.90	-1.9	43.23	27.21	-37.1	191.11
Gwanda	Wenlock	Highest	124.19	126.78	2.1	109.31	64.60	-40.9	191.37
Marondera	Chiota	Lowest	226.27	121.28	-46.4	57.02	71.67	25.7	192.94
Matobo	Seear Block	Middle	830.25	95.15	-88.5	107.72	105.38	-2.2	200.53
Mutare	Chinyauwhera	Middle	311.22	163.35	-47.5	33.36	37.66	12.9	201.01
Mount Darwin	Gatshe	Middle	322.16	152.35	-52.7	18.33	50.08	173.2	202.43
Gwanda	Makwe	Highest	76.78	143.83	87.3	109.31	64.60	-40.9	208.42
Makoni	Makoni	Lowest	368.83	173.25	-53.0	44.12	39.42	-10.7	212.67
Lupane	Lupane	Middle	79.53	94.88	19.3	75.42	118.15	56.7	213.03
Chirumhanzu	Chirumanzi	Lowest	545.49	159.50	-70.8	53.74	57.34	6.7	216.84
Bubi	Inyati	Middle	66.66	168.85	153.3	37.63	49.78	32.3	218.63
Mutasa	Manga	Lowest	237.71	199.38	-16.1	46.46	28.22	-39.3	227.59
Makoni	Chiduku	Middle	371.66	175.18	-52.9	42.57	54.18	27.3	229.35
Nkayi	Nkayi	Middle	157.60	150.15	-4.7	70.95	79.41	11.9	229.56
Zvishavane	Runde	Highest	200.01	209.55	4.8	40.92	28.56	-30.2	238.11
Binga	Lubumbi	Highest	94.77	155.38	64.0	57.06	85.73	50.2	241.11
Gutu	Gutu	Middle	531.88	198.28	-62.7	56.36	43.79	-22.3	242.07
Lupane	Mzola	Middle	190.63	169.68	-11.0	114.61	78.57	-31.4	248.24
Buhera	Save	Highest	294.72	203.23	-31.0	59.10	48.48	-18.0	251.71
Masvingo	Masvingo	Middle	388.11	234.58	-39.6	40.18	24.21	-39.7	258.79
Mutasa	Mutasa North	Lowest	116.24	245.58	111.3	10.77	14.27	32.6	259.85
Umzingwane	Esiphezini	Middle	163.79	216.70	32.3	56.44	49.09	-13.0	265.79
Mutoko	Mutoko	Middle	169.68	215.33	26.9	40.12	59.98	49.5	275.30
Chiredzi	Sangwe	Highest	60.69	252.73	316.4	44.45	22.99	-48.3	275.72
Mudzi	Mudzi	Highest	151.55	253.55	67.3	16.29	23.98	47.2	277.53
Matobo	Mbongolo	Highest	164.37	230.45	40.2	79.56	58.38	-26.6	288.83
Chivi	Chivi	Highest	289.66	252.45	-12.8	56.02	39.64	-29.2	292.09
Chikomba	Save North	Lowest	496.40	236.50	-52.4	61.48	70.32	14.4	306.82
Marondera	Svosve	Lowest	150.54	234.03	55.5	59.21	73.38	23.9	307.41
Guruve	Bakasa	Lowest	478.25	268.13	-43.9	21.88	49.45	126.0	317.57
Makonde	Magondi	Lowest	616.28	222.75	-63.9	73.91	98.24	32.9	320.99
Bindura	Musana	Lowest	290.48	281.60	-3.1	35.01	44.72	27.7	326.32
Centenary	Mukumbura West	Middle	1,885.18	262.63	-86.1	24.92	65.59	163.2	328.21
Mutasa	Manyika	Lowest	228.22	256.58	12.4	70.22	74.47	6.1	331.05
Nyanga	Zimbiti	Lowest	407.63	299.75	-26.5	74.10	36.88	-50.2	336.63
Seke	Seke	Lowest	331.90	288.75	-13.0	40.00	48.69	21.7	337.44
Nyanga	Inyanga North	Lowest	299.06	322.30	7.8	41.61	22.74	-45.3	345.04
Masvingo	Mtirikwi	Middle	294.94	332.48	12.7	50.64	16.25	-67.9	348.73
Nyanga	Nyanga	Lowest	237.00	313.78	32.4	40.47	39.81	-1.6	353.58
Kwekwe	Silobela	Lowest	435.6	281.05	-35.5	63.53	76.97	21.2	358.02
Nyanga	Saint Swithins	Middle	139.29	242.55	74.1	112.34	118.68	5.6	361.23
Unguza	Ntabazinduna	Middle	74.99	329.18	338.9	42.61	33.01	-22.5	362.19
Nyanga	Nyamaropa	Lowest	352.69	306.90	-13.0	61.75	59.28	-4.0	366.18
Gutu	Chikwanda	Middle	445.34	315.43	-29.2	56.86	56.50	-0.6	371.92
Nyanga	Matizi	Lowest	542.52	342.38	-36.9	67.49	37.94	-43.8	380.31
Goromonzi	Chikwaka	Lowest	347.71	325.60	-6.4	43.46	60.68	39.6	386.28
Goromonzi	Chinyika	Lowest	142.78	347.88	143.6	44.32	39.44	-11.0	387.31
Kadoma	Ngezi	Lowest	514.53	328.35	-36.2	51.70	85.31	65.0	413.66
Bubi	Inkosikazi	Lowest	113.49	337.15	197.1	78.68	83.66	6.3	420.81
Chikomba	Nharira	Middle	285.23	384.18	34.7	53.89	37.52	-30.4	421.70
Chegutu	Mondoro	Lowest	385.39	363.00	-5.8	75.98	67.91	-10.6	430.91
Umzingwane	Matopo	Middle	158.4	395.18	149.5	53.71	40.30	-25.0	435.48
Makonde	Mupfure	Lowest	395.89	347.33	-12.3	75.74	94.60	24.9	441.93
Mutare	Dora	Middle	353.54	430.93	21.9	29.00	15.63	-46.1	446.56
Chimanimani	Chikukwa	Middle	38.06	427.90	1024.3	9.09	18.82	107.1	446.72
Gweru	Chiwundura	Lowest	182.74	411.40	125.1	47.37	47.07	-0.6	458.47
Hwedza	Wedza	Lowest	326.73	382.80	17.2	58.30	76.45	31.1	459.25
Mudzi	Ngarwe	Highest	252.29	411.40	63.1	24.53	61.04	148.8	472.44

Table 4. Zimbabwe: Current vulnerability—Changes in income from agriculture and in-kind transfers (continued)

District	Communal land	Vulnerability Tercile (baseline)	Baseline \$ value	Current \$ value	Percent change	Baseline \$ value	Current \$ value	Percent change	Current per capita income
Gokwe	Kana	Middle	374.08	410.58	9.8	51.54	61.93	20.2	472.51
Zvishavane	Mazvihwa	Middle	450.84	433.68	-3.8	48.22	47.14	-2.3	480.81
Masvingo	Zimutu	Middle	343.04	441.10	28.6	56.07	62.44	11.4	503.54
Guruve	Dande South	Middle	261.06	485.10	85.8	4.70	20.08	326.9	505.18
Mount Darwin	Mukumbura East	Highest	88.39	441.38	399.4	24.92	65.59	163.2	506.96
Bindura	Masembura	Lowest	448.11	460.35	2.7	36.15	56.38	56.0	516.73
Kariba	Omay	Highest	70.84	486.20	586.3	0.00	41.8	100.0	528.00
Mazowe	Chiweshe	Lowest	337.56	476.03	41.0	36.78	55.89	52.0	531.92
Gutu	Denhere	Lowest	1179.75	442.20	-62.5	73.95	95.34	28.9	537.54
Rushinga	Chimanda	Middle	563.09	511.78	-9.1	20.98	30.22	44.0	542.00
Goromonzi	Kunzwi	lowest	323.54	451.83	39.7	110.55	98.86	-10.6	550.69
Zvimba	Chirau	Lowest	592.10	495.55	-16.3	142.34	65.89	-53.7	561.44
Makoni	Weya	Lowest	307.89	516.18	67.6	48.5	59.44	22.6	575.62
Zvimba	Zwimba	Lowest	405.19	455.68	12.5	76.2	124.18	63.0	579.85
Shurugwi	Shurugwi	Lowest	359.07	519.48	44.7	55.70	60.90	9.3	580.37
Guruve	Guruve	Lowest	638.94	509.30	-20.3	56.29	72.12	28.1	581.42
Murehwa (UMP)	Pfungwe	Middle	489.28	543.13	11.0	19.95	45.83	129.7	588.95
Makoni	Chikore	Lowest	287.93	516.73	79.5	95.95	76.93	-19.8	593.66
Nyanga	Sawunyama	Lowest	562.24	592.35	5.4	54.53	20.03	-63.3	612.38
Mutare	Muromo	Middle	388.80	602.25	54.9	18.63	11.74	-37.0	613.99
Makoni	Tanda	Lowest	345.79	553.85	60.2	61.13	65.67	7.4	619.52
Murehwa (UMP)	Uzumba	Middle	362.97	572.55	57.7	39.05	51.80	32.6	624.35
Gutu	Serima	Middle	628.62	531.30	-15.5	64.17	98.64	53.7	629.94
Rushinga	Masoso East	Middle	344.38	609.40	77.0	15.07	35.74	137.1	645.14
Gokwe	Gokwe	Middle	650.84	601.15	-7.6	53.35	50.08	-6.1	651.23
Guruve	Kachuta	Lowest	524.98	594.83	13.3	40.67	68.05	67.3	662.87
Kwekwe	Zhombe	Lowest	568.87	612.98	7.8	57.24	66.91	16.9	679.88
Centenary	Muzarabani	Middle	360.88	639.38	77.2	18.58	42.90	130.9	682.28
Mount Darwin	Kandeya	Lowest	514.91	636.63	23.6	29.98	54.18	80.7	690.80
Chikomba	Manyeni	Lowest	425.21	576.40	35.6	79.65	115.42	44.9	691.82
Murehwa	Mangwende	Lowest	632.23	630.58	-0.3	44.01	63.04	43.2	693.62
Shamva	Bushu	Lowest	335.31	644.33	92.2	35.82	54.66	52.6	698.98
Hurungwe	Rengwe	Middle	336.99	765.88	127.3	0.00	0.00	0.0	765.88
Kariba	Kanyati	Middle	463.51	804.10	73.5	0.00	45.20	100.0	849.30
Binga	Busi	Highest	189.45	764.50	303.5	57.01	85.65	50.2	850.15
Mudzi	Chikwizo	Middle	402.08	790.35	96.6	49.20	72.45	47.3	862.80
Gokwe	Sebungwe	Middle	1,140.89	725.73	-36.4	115.39	177.58	53.9	903.31
Shamva	Madziwa	Lowest	473.36	861.85	82.1	35.42	54.79	54.7	916.64
Hurungwe	Hurungwe	Lowest	658.71	834.08	26.6	65.99	96.86	46.8	930.93
Centenary	Gutsa	Lowest	1,663.81	796.13	-52.2	79.89	151.64	89.8	947.76
Kadoma	Sanyati	Lowest	942.45	1,100.00	16.7	46.20	59.03	27.8	1159.03
Hurungwe	Mukwichi	Lowest	353.57	1,179.20	233.5	22.50	39.92	77.4	1219.12
Gokwe	Gandavaroyi	Middle	788.56	1,149.23	45.7	119.27	152.05	27.5	1301.27
Murehwa (UMP)	Maramba	Lowest	835.56	1,566.68	87.5	31.20	60.78	94.8	1627.45
Mudzi	Mkota	Lowest	699.68	2,815.73	302.4	86.27	48.46	-43.8	2864.18
Hurungwe	Nyaodza	Lowest	715.28	3,943.78	451.4	0.00	0.00	0.0	3943.78
Hurungwe	Piriwiri	Lowest	684.97	4,945.33	622.0	0.00	0.00	0.0	4945.33

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Table ZM-A1. Map key for communal lands map of Zimbabwe

Map number	Communal land	District	Map number	Communal land	District
1	Maramani	Beitbridge	63	Kachuta	Guruve
2	Mtetengwe	Beitbridge	64	Serima	Gutu
3	Diti	Beitbridge	65	Denhere	Gutu
4	Masera	Beitbridge	66	Gutu	Gutu
5	Chipise	Beitbridge	67	Chikwanda	Gutu
6	Siyoka	Beitbridge	68	Makwe	Gwanda
7	Machuchuta	Beitbridge	69	Matshetshe	Gwanda
8	Dendele	Beitbridge	70	Wenlock	Gwanda
9	Matsai	Bikita	71	Dibilishaba	Gwanda
10	Bikita	Bikita	72	Shashi	Gwanda
11	Musana	Bindura	73	Gwanda	Gwanda
12	Masembura	Bindura	74	Gwaranyemba	Gwanda
13	Lubumbi	Binga	75	Manyame	Gweru
14	Busi	Binga	76	Chiwundura	Gweru
15	Siabuwa	Binga	77	Rengwe	Hurungwe
16	Manjolo	Binga	78	Mukwichi	Hurungwe
17	Inyati	Bubi	79	Nyaodza	Hurungwe
18	Inkosikazi	Bubi	80	Piriwiri	Hurungwe
19	Save	Buhera	81	Hurungwe	Hurungwe
20	Sansukwe	Bulilimangwe	82	Hwange	Hwange
21	Nata	Bulilimangwe	83	Wedza	Hwedza
22	Maitengwe	Bulilimangwe	84	Insiza	Insiza
23	Ingwezi	Bulilimangwe	85	Godlwayo	Insiza
24	Ramakwebane	Bulilimangwe	86	Glassblock	Insiza
25	Mpimbila	Bulilimangwe	87	Ngezi	Kadoma
26	Brunapeg	Bulilimangwe	88	Sanyati	Kadoma
27	Mpande	Bulilimangwe	89	Kanyati	Kariba
28	Ngulube	Bulilimangwe	90	Gatshe Gatshe	Kariba
29	Radtladi	Bulilimangwe	91	Omay	Kariba
30	Mphoengs	Bulilimangwe	92	Silobela	Kwekwe
31	Mukumbura West	Centenary	93	Zhombe	Kwekwe
32	Gutsa	Centenary	94	Mzola	Lupane
33	Muzarabani	Centenary	95	Lupane	Lupane
34	Mondoro	Chegutu	96	Dandanda	Lupane
35	SaveNorth	Chikomba	97	Magondi	Makonde
36	Manyeni	Chikomba	98	Mupfure	Makonde
37	Nharira	Chikomba	99	Makoni	Makoni
38	Muwushu	Chimanimani	100	Chiduku	Makoni
39	Chikukwa	Chimanimani	101	Chikore	Makoni
40	Ngorima	Chimanimani	102	Tanda	Makoni
41	Mutambara	Chimanimani	103	Weya	Makoni
42	Mutema	Chipinge	104	Chiota	Marondera
43	Tamandayi	Chipinge	105	Svosve	Marondera
44	Ndowoyo	Chipinge	106	Mtirikwi	Masvingo
45	Musikavanhu	Chipinge	107	Masvingo	Masvingo
46	Sengwe	Chiredzi	108	Nyajena	Masvingo
47	MatibiII	Chiredzi	109	Zimutu	Masvingo
48	Sangwe	Chiredzi	110	Semukwe	Matobo
49	Chirumanzi	Chirumhanzu	111	Kumalo	Matobo
50	Mashava South	Chivi	112	Tshatshani	Matobo
51	Chivi	Chivi	113	Seear Block	Matobo
52	Sebungwe	Gokwe	114	Mbongolo	Matobo
53	Gandavaroyi	Gokwe	115	Gulati	Matobo
54	Kana	Gokwe	116	Maribeha	Matobo
55	Gokwe	Gokwe	117	Mambali	Matobo
56	Chikwaka	Goromonzi	118	Chiweshe	Mazowe
57	Chinamora	Goromonzi	119	Mberengwa	Mberengwa
58	Chinyika	Goromonzi	120	Chiswiti	Mt.Darwin
59	Kunzwi	Goromonzi	121	Masoso West	Mt.Darwin
60	Dande	Guruve	122	Kandeya	Mt.Darwin
60	Dande	Guruve	123	Mukumbura East	Mt.Darwin
61	Guruve	Guruve	124	Mkota	Mudzi
62	Bakasa	Guruve	125	Mudzi	Mudzi

Table ZM-A1. Map key for communal lands map of Zimbabwe (continued)

Map number	Communal land	District
126	Ngarwe	Mudzi
127	Chikwizo	Mudzi
128	Mangwende	Murehwa
129	Maramba	UMP
130	Uzumba	UMP
131	Pfungwe	UMP
132	Chinyauwhera	Mutare
133	Dora	Mutare
134	Muromo	Mutare
135	Marange	Mutare
136	Zimunya	Mutare
137	Rowa	Mutare
138	Manga	Mutasa
139	Holdenby	Mutasa
140	Manyika	Mutasa
141	Mutasa South	Mutasa
142	Mutasa North	Mutasa
143	Mutoko	Mutoko
144	MatibiI	Mwenezi
145	Maranda	Mwenezi
146	Nkayi	Nkayi
147	Zimbiti	Nyanga
148	Sawunyama	Nyanga
149	Matizi	Nyanga
150	St.Swithins	Nyanga
151	Nyanga	Nyanga
152	Nyamaropa	Nyanga
153	Inyanga North	Nyanga
154	Masoso East	Rushinga
155	Chimanda	Rushinga
156	Seke	Seke
157	Madziwa	Shamva
158	Bushu	Shamva
159	Shurugwi	Shurugwi
160	Tsholotsho	Tsholotsho
161	Ntabazinduna	Unguza
162	Matopo	Umzingwane
163	Nswazi	Umzingwane
164	Mzinyatini	Umzingwane
165	Esiphezini	Umzingwane
166	Ndanga	Zaka
167	Chirau	Zvimba
168	Zvimba	Zvimba
169	Runde	Zvishavane
170	Mazvihwa	Zvishavane
171	Ungova	Zvishavane

Table ZM-A2. Components and indicators—baseline and current vulnerability

Baseline component	Component weight	
Income from agriculture and in-kind transfers	11	Sum of the average annual per capita value (in 1994Z\$) of communal: Staple crop production (maize, sorghum, rapoko, mhunga: 1980/81-1990/91) Cash crop production (cotton, sunflower, soybean, groundnut, edible beans, and burley, flue, and oriental tobacco: 1980/81-1990/91) Livestock off-take income (assumed rate of 5 percent for all cattle, goat, sheep, pig, donkey: 1984-91) Food-for-work distributions (primarily maize: 1982-91) Adjustment for coefficient of variability of ag. production (1980-91)
Level of development and asset ownership	6	Index (Level of Development = 4, Livestock = 2) of: Average annual per capita value (in 1994 Z\$) of communal area livestock holdings (as above, all animals: 1984-91) Level of development index (all equally weighted) District infant mortality rate (per 1,000) District female literacy rate (percent of total population) District housing type (modern housing as percent of total) District electrification rate (percent households electrified) District toilet type (any facility as percent of total) District cooking fuel (wood as percent of total)
Crop risk	4	Index (NDVI = 2; Drought = 2) of: Average annual maximum NDVI per communal area (1981-91) Rainfall index of equally weighted mean, C/V, and frequency of drought, by watershed: (1911-91)
Observed stress	4	Average percent of District population eligible for drought relief: (1981-91)
Relative baseline vulnerability		"Average Component" = sum of component ranks/4

Table ZM-A2. Components and indicators—baseline and current vulnerability *(continued)*

Current component

Agriculture income Sum of the average annual per capita value (in 1994 Z\$) of communal:
Staple and cash crop production (as above: 1991/92–1993/94)
Livestock off-take income (as above: average of 1992, 1993)

Current vulnerability A ranking constructed with the baseline vulnerability rank and change in current agricultural income

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FEWS Vulnerability Index

Level of Vulnerability	Conditions of Vulnerability	Typical Coping Strategies and/or Behaviors	Interventions to Consider
SLIGHTLY VULNERABLE	<p>Maintaining or Accumulating Assets</p> <p>and</p> <p>Maintaining Preferred Production Strategy</p>	<p>Assets/resources/wealth: either accumulating additional assets/resources/wealth or only minimal net change (normal "belt-tightening" or seasonal variations) in assets, resources or wealth over a season/year. I.e., coping to minimize risk.</p> <p>Production Strategy: any changes in production strategy are largely volitional for perceived gain, and not stress related.</p>	Developmental Programs
MODERATELY VULNERABLE	<p>Drawing-down Assets</p> <p>and</p> <p>Maintaining Preferred Production Strategy</p>	<p>Assets/resources/wealth: coping measures include drawing down or liquidating less important assets, husbanding resources, minimizing rate of expenditure of wealth, unseasonable "belt-tightening" (e.g., drawing down food stores, reducing amount of food consumed, sale of goats or sheep).</p> <p>Production Strategy: only minor stress-related change in overall production/income strategy (e.g., minor changes in cropping/planting practices, modest gathering of wild food, inter-household transfers and loans, etc.).</p>	Mitigation and/or Development: Asset Support (release food price-stabilization stocks, sell animal fodder at "social prices," community grain bank, etc.)
HIGHLY VULNERABLE	<p>Depleting Assets</p> <p>and</p> <p>Disrupting Preferred Production Strategy</p>	<p>Assets/resources/wealth: liquidating the more important investment, but not yet "production," assets (e.g., sale of cattle, sale of bicycle, sale of possessions such as jewelry).</p> <p>Production Strategy: coping measures being used have a significantly costly or disruptive character to the usual/preferred household and individual life-styles, to the environment, etc. (e.g., time-consuming wage labor, selling firewood, farming marginal land, labor migration of young adults, borrowing from merchants at high interest rates).</p>	Mitigation and/or Relief: Income and Asset Support (Food-for-Work, Cash-for Work, etc.)
EXTREMELY VULNERABLE or AT-RISK	<p>Liquidating Means of Production</p> <p>and</p> <p>Abandoning Preferred Production Strategy</p>	<p>Assets/resources/wealth: liquidating "production" resources (e.g., sale of planting seed, hoes, oxen, land, prime breeding animals, whole herds).</p> <p>Production Strategy: Seeking nontraditional sources of income, employment, or production that preclude continuing with preferred/usual ones (e.g., migration of whole families).</p>	Relief and/or Mitigation: Nutrition, Income and Asset Support (food relief, seed packs, etc.)
FAMINE	Destitute	Coping Strategies Exhausted: no significant assets, resources, or wealth; no income/production.	Emergency Relief (food, shelter, medicine)

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Key Terms

At Risk — FEWS Reports use the term “at risk” to describe populations either currently, or in the near future, expected to have insufficient food, or resources to acquire food, to avert a nutritional crisis (i.e., progressive deterioration in health or nutritional condition below the status quo). “At risk” populations require specific intervention to avoid a life-threatening situation. Food needs estimates are sometimes included in FEWS reports. Famines are the culmination of a slow-onsetting process, which can be extremely complex. The food needs of specific “at-risk” populations depend on the point in this process when the problem is identified and the extent of its cumulative impact on the individuals concerned. The amount of food assistance required, from either internal or external sources, depends upon many considerations.

Vulnerability — FEWS Reports use the term “vulnerability” to indicate relative susceptibility to food insecurity of groups of people or areas. In FEWS usage, vulnerability is always characterized by its degree: slight, moderate, high, or extreme. Extreme vulnerability is synonymous with “at risk.” Vulnerability is a dynamic concept that incorporates both chronic and current conditions. Chronic vulnerability involves long-term conditions that predispose a particular group or region to food insecurity. Current vulnerability highlights short-term changes in food security status and their implications. Vulnerability analysis involves three levels of concern: food availability, food access, and food utilization. These levels are linked by a common analytical framework that interprets all relevant information for its food security impact on the diversified income generating possibilities of different groups of households.

ITCZ — The Intertropical Convergence Zone (ITCZ) is equivalent to a meteorological equator; a region of general upward air motion and relatively low surface pressure bounded to the north and south by the northeast and southeast Trade Winds, respectively. The upward motion in the ITCZ forms the rising branch of the meridional Hadley Circulation. The ITCZ moves north and south following the apparent movement of the sun. It is at its most northerly position in the summer months. The position of the ITCZ normally defines the northern limits of possible precipitation in the Sahel; rainfall generally occurs 100 to 300 kilometers south of the ITCZ, with local convective activity organized by westward moving “Easterly Waves.”

NDVI — Normalized Difference Vegetation Index (NDVI) images are created at the laboratory of the National Aeronautics and Space Administration (NASA) Global Inventory Modeling and Monitoring System (GIMMS). The images are derived from Global Area Coverage (GAC) imagery (of approximately seven kilometers resolution) received from the Advanced Very High Resolution Radiometer (AVHRR) sensors on board the National Oceanic and Atmospheric Administration (NOAA) Polar Orbiting series of satellites. The polar orbit satellites remotely sense the entire Earth and its atmosphere once each day and once each night, collecting data in five spectral bands. Bands 1 and 2 sense reflected red and infrared wavelengths, respectively, and the remaining three bands sense emitted radiation in three different spectral bands. The NDVI images are created by calculating “(infrared - red)/(infrared + red)” for each pixel from the daytime satellite passes. Since chlorophyll reflects more in the infrared band than in the red band, higher NDVI values indicate the presence of more chlorophyll and, by inference, more live vegetation. A composite of daily NDVI images is created for each 10-day period, using the highest NDVI value for each pixel during that period. This technique minimizes the effects of clouds and other forms of atmospheric interference that tend to reduce NDVI values. NDVI is often referred to as a measure of “greenness” or “vegetative vigor.” The NDVI images are used to monitor the response of vegetation to weather conditions.

METEOSAT — METEOSAT-based Rainfall Estimates. FEWS uses estimates of current rainfall based on cold cloud duration as measured by thermal infrared radiometers on the METEOSAT satellite. The estimates are calculated every 10 days by the Department of Meteorology at the University of Reading in the U.K. Cold cloud duration correlates well with thunderstorm generated rainfall and, thus, is suitable for use in the semi-arid Sahel. The method works best on level terrain; hilly areas may produce local enhancements or rain-shadow areas that are not detected. In level areas the method has an accuracy of “rain/no rain” of at least 85 percent (based on a comparison with ground data). At a dekadal (ten-day) scale, 80 percent of rainfall amounts under 60 millimeters (mm) are accurate to plus or minus 10 mm, while rainfall over 60 mm is accurate to plus or minus 20 mm. This accuracy is acceptable for use in the FEWS-monitored region given that the method provides near-real-time coverage for a large area at a resolution of less than 10 kilometers.